THIRD SERIES VOL 57 NUMBER 3 JANUARY 1950

THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

66 PORTLAND PLACE LONDON W1 TWO SHILLINGS AND SIXPENCE

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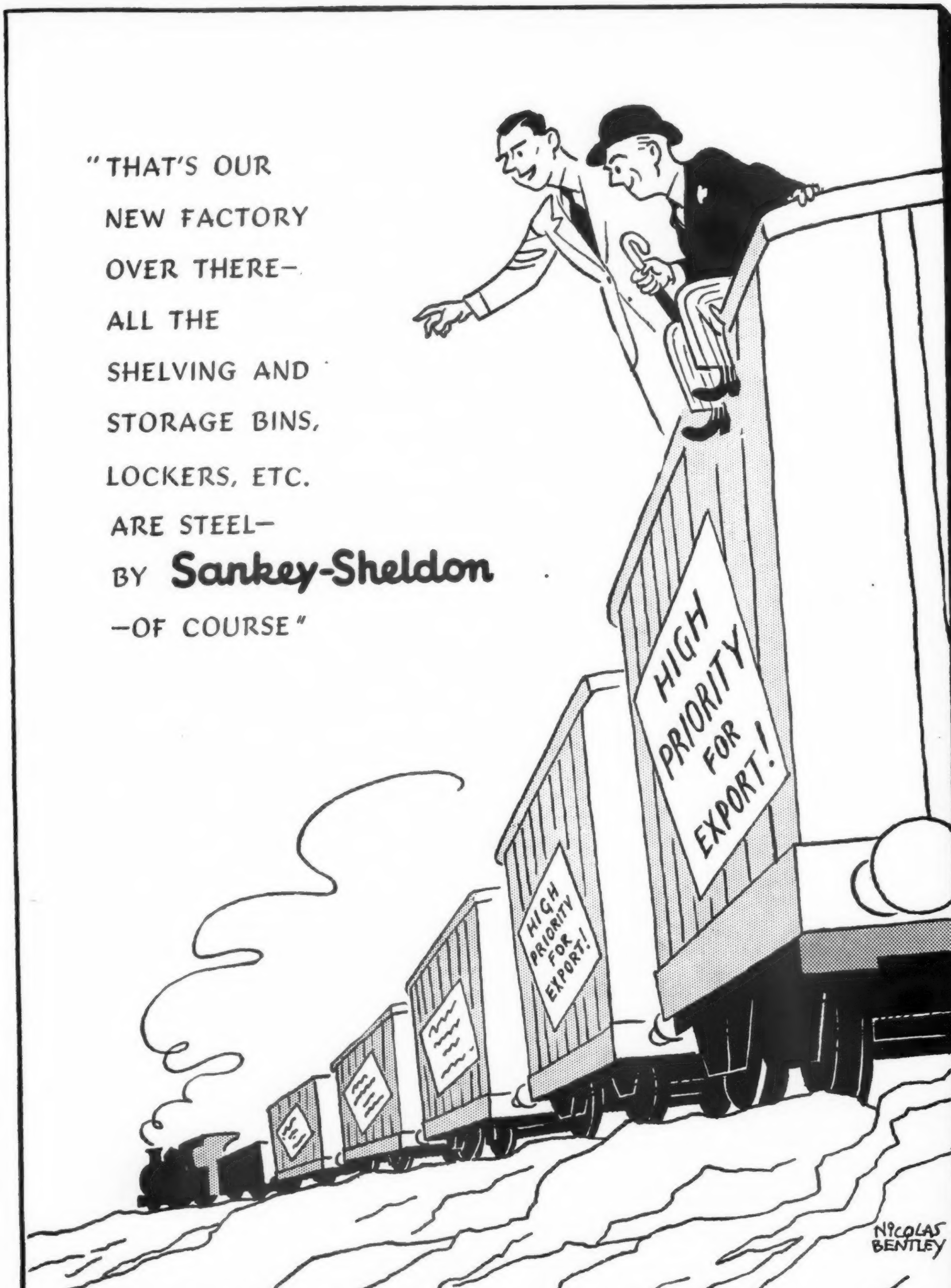
A stonemason's yard on a blitzed site near St. Paul's Cathedral. From a drawing by Alan Sorrell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New Year's Honours

Mr. John Ninian Comper and Mr. Philip Hendy, Director of the National Gallery, have been created Knights Bachelor in the New Year's Honours List. Sir William Douglas, K.B.E., secretary, Ministry of Health, is made a Knight Grand Cross of the Order of the Bath, and the Knight Grand Cross of the Order of the British Empire has been conferred upon Sir Malcolm Trustram Eve, M.C., T.D., K.C., lately Chairman of the Central Land Board and of the War Damage Commission, and upon the Earl of Ilchester [Hon. *F*]. The following are now Commanders of the Order of the British Empire: Mr. J. R. Beard, lately Chairman, Codes of Practice Council, Mr. O. G. S. Crawford, archaeologist, Mr. K. I. Julian, Chairman, South-East Metropolitan Regional Hospital Board, Mr. C. A. Morrison, Chief Surveyor, Ministry of Works, Mr. F. M. Sleeman, Immediate Past-President, National Federation of Building Trades Employers, and Mr. T. N. Wynne-Jones, O.B.E. [*F*], Chief Architect, Public Works Department, Ceylon.

The O.B.E. has been conferred upon Mr. J. C. Cox, Secretary, Building Apprenticeship and Training Council, Ministry of Works, Mr. Kenneth Holmes, Principal, Leicester College of Art, Mr. W. M. Keesey, M.C. [*A*] and Alderman A. H. Telling, General Secretary, National Association of Operative Plasterers. Mr. D. W. Ayre [*A*] of the Ministry of Works, gets the British Empire Medal and Mr. Harold J. Cox [*L*] of Camberley, Surrey, has been awarded the King's Police and Fire Service Medal for Distinguished Service.

Sir John Comper, who is 85 years of age, is not well known to the architectural profession generally, though his scholarly and sensitive ecclesiastical work is appreciated by connoisseurs of design. He was articled to Bodley and Garner and has carried on the Gothic tradition in many new churches and alterations and additions to others, though with a feeling for materials and subtlety of form not always noticeable in the works of his Victorian predecessors. He designed the Warrior's chapel and several nave windows in Westminster Abbey, the Welsh national war memorial at Cardiff and new churches at Clerkenwell, Regents Park, Wellingborough, Wimborne, Rochdale, Chailey, St. Albans and Portsmouth. The award is a tribute to a fine artist.

The Annual Reception

The Royal Institute's Annual Reception will be held on Friday 28 April. The President and Mrs. Waterhouse will receive members and guests from 8.15 to 9 p.m. There will be dancing from 9 p.m. to midnight. Dress will be evening dress or uniforms with decorations though this will not be obligatory; members who attend in lounge suits will be welcome.

The Architecture of Transport Exhibition

As announced in the December JOURNAL, this exhibition, to be held at the R.I.B.A. in June, is now being organized. The exhibition will cover road, rail, sea and air transport and will aim to show the architect's contribution in respect of types of buildings and design generally in this field.

The Exhibition Sub-Committee ask architects who have material suitable for inclusion in the exhibition to submit it as soon as possible, and in any case not later than 11 March. The following points may be of assistance to architects when submitting material:—

1. The Exhibition Sub-Committee intend to give preference to completed work, but in certain cases it will obviously be necessary to show projected schemes.

2. The Sub-Committee are anxious to obtain, for the final exhibition, as many models as possible. Architects are asked, in the first instance, to submit photographs of models and to indicate their sizes.

3. Architects are asked not to submit any material which they might require urgently for another purpose, as a request to return immediately material which has been submitted for selection may seriously interfere with the work of the Sub-Committee. Copies of plans, rough proofs of photographs, etc., will be adequate at the beginning.

4. No large mounted drawings should be submitted owing to difficulties of transport and storage, and no drawings in frames of any kind can be accepted.

5. All packages must be clearly labelled 'Transport Exhibition', R.I.B.A., 66 Portland Place, London, W.1, and should *reach the Institute not later than Saturday* 11 *March* 1950.

6. The Sub-Committee can not undertake to guarantee the return of any work submitted until after the Exhibition, but will try to return material not required for the exhibition as soon as they can.

The Prizes and Studentships

The list of the Council's awards of Prizes and Studentships was read at the General Meeting on 3 January and is published on page 96 of this JOURNAL. The President will present the medals and prizes and deliver an address to students at the general meeting to be held on Tuesday 7 February at 6 p.m. The criticism of designs submitted will be given by Mr. E. Maxwell Fry [*F*]. The competition drawings will remain on view in the Henry Florence Hall until 7 February from 10 a.m. to 7 p.m., Saturdays 10 a.m. to 5 p.m.

Danish Architecture of Today Exhibition

The exhibition of Danish Architecture of Today which will be on view at the R.I.B.A. from Tuesday 28 February to Wednesday 29 March, has arrived at the London docks. The exhibition is divided into seven sections and covers Town Planning, Housing, Civic Centres and Churches, Schools, Recreation and Sports Buildings, Factories and Commercial Buildings. While some of the buildings exhibited were built before the war, it will be found that quite a large number were either completed during the war period or have been built in the five years since the war. This exhibition will therefore be of particular interest to those who have not had an opportunity of visiting Denmark in recent years.

The exhibition will also include a few specially selected examples of furniture, textiles, ceramics, books, glass and other examples of good industrial design. These are, in most cases, likely to be articles designed more recently than at the time of the exhibition of Danish Domestic Design which was held at the R.I.B.A. in 1947. While it has not been possible to import constructional materials from Denmark, as was done in the case of Switzerland for the Swiss Exhibition, all the light fittings used in the exhibition will be of Danish manufacture.

The three Danish architects primarily responsible for the organization of the exhibition are Mr. Finn Juhl, Mr. Ole Hagen, and Mr. Esbjorn Hiort and it is hoped that all three will be present at the time of the exhibition. It is also expected that Mr. Langkilde, President of the Akademisk Arkitektforening will be here for the opening ceremony, which will be performed by the Danish Ambassador on 27 February. Mr. Finn Juhl has prepared the layout of the exhibition for the Henry Florence Hall.

The exhibition will be accompanied by a 60 page handbook in English. This will contain a number of illustrations amongst which will be found: The University of Aarhus; an open air school at Sund; flats at Bispeparken, Bellahoj and Gentofte; houses at Vedbak; one-family cottages for large families in Husum; a country house at Rungsted; the Advent Church at Copenhagen; the crematorium at Gentofte; town halls at Aarhus and Sollerod; Kastrup airport; Nyborg public library; the State broadcasting building in Copenhagen; a pumping station at Skovshoved; a project for the A/S Atlas company at Lundtofte and a water-tower at Fortunen.

The exhibition is certain to arouse keen interest among British architects and, as with the Swiss Exhibition in 1946, among the general public as well.

The British Architects' Conference

Elsewhere in this JOURNAL is published the official list of hotels in Bristol, which serves as a reminder that the British Architects' Conference is not far ahead. This year it coincides with the centenary celebrations of the Bristol Society of Architects who are arranging a series of functions suitable to the double event. A detailed announcement of these arrangements will be published in due course. Meanwhile publication of the hotel list, which will appear in all issues of the JOURNAL until March, should be a warning to those members wishing to attend that they should book their accommodation early.

Ambassador for British Town Planning

Professor Gordon Stephenson, Professor of Civic Design at the University of Liverpool, and prior to 1948 Chief Planning Officer at the Ministry of Town and Country Planning, went to Belgium on 8 January to lecture for the British Council on planning and reconstruction in Great Britain. Speaking in French, he led a colloquium at the Institute Superieur et International d'Urbanisme Applique in Brussels and he also lectured in Liege and Antwerp. His lecture comprised a broad survey of the planning and reconstruction problems facing this country and of the machinery devised for their solution.

The Cubing of Buildings for Approximate Estimates of Cost

Standard methods of computing the cube of buildings for approximate estimates were first formulated by the R.I.B.A. in 1927 and were published annually in the 'Kalendar.' The document was also available separately as a printed leaflet. This is now practically out of print and in consequence the Council, on the recommendation of the Practice Committee, have authorized the publication of the following revised edition. These standard methods of measurement are for the guidance of members in connection with the cubing of buildings for computing *approximate estimates of cost.*

NO. 1. LENGTH AND WIDTH MEASUREMENTS

To be taken between the outer faces of the walls.

NO. 2. HEIGHT MEASUREMENT

To be taken from the top of the concrete foundation to (in the case of a pitched roof):

a line midway between the point of intersection of the outer surfaces of wall and roof, and the apex; or, (in the case of a flat roof):

a height of 2 ft. above the roof.

In the case of a Mansard roof, its cubic contents are to be calculated separately.

NO. 3 PROJECTIONS

After measuring the main structure an additional cube is to be made for the following projections:—(*a*) Porches, (*b*) Bays and Oriels, (*c*) Turrets and Fleches, (*d*) Dormers, (*e*) Chimney Stacks, (*f*) Lantern Lights.

Note.—Any work outside the above-mentioned confines should be dealt with separately.

The attention of members is called to the fact that a separate code for cubing buildings in respect of *development charges* under the Town and Country Planning Act 1947 has been jointly prepared by the R.I.B.A. and the Royal Institution of Chartered Surveyors, and has been adopted for that purpose by the Central Land Board. This code is set out in Appendix 'A' of Practice Notes (First Series) issued by the Central Land Board, which are obtainable at H.M. Stationery Office. It was also published for the reference of members in the March 1949 issue of the JOURNAL (page 240).

Diploma of Distinction in Town Planning

The Council have approved the award of the Diploma of Distinction in Town Planning to Mr. Graham R. Dawbarn, C.B.E., M.A. [*F*].

Members' Signatures

The illegibility of signatures and failure to indicate class of membership on letters from members causes the R.I.B.A. staff a considerable waste of time and effort. The Institute's daily post from members averages some 200 letters a day and there are invariably several letters which involve a considerable amount of difficulty in trying to find out from whom they come. Sometimes there has to be a search of records of the architects living in the town printed at the head of the letter to discover the name of the sender from his address. Will every member writing to the Institute please make a special point of seeing that his signature is legible and that his class of membership is indicated?

R.I.B.A. Diary

TUESDAY 7 FEBRUARY 6 P.M. *President's Address to Students.* Criticism by E. Maxwell Fry [*F*] of Designs submitted.

TUESDAY 14 FEBRUARY 6 P.M. Architectural Science Board Lecture. *Developments in Timber Technique.* R. T. Walters [*A*].

TUESDAY 21 FEBRUARY 6 P.M. *The Work of Lethaby, Webb and Morris.* Noel Rooke. (A small exhibition on the work of Lethaby, Webb and Morris will be held in the Foyer of the R.I.B.A. from 15 February to 22 February inclusive.)

TUESDAY 28 FEBRUARY TO WEDNESDAY 29 MARCH INCLUSIVE. Exhibition of Danish Architecture of Today (see first column on this page).

Concert Halls

By Hope Bagenal [*F*]

Read before the Royal Institute of British Architects, 3 January 1950. The President in the Chair

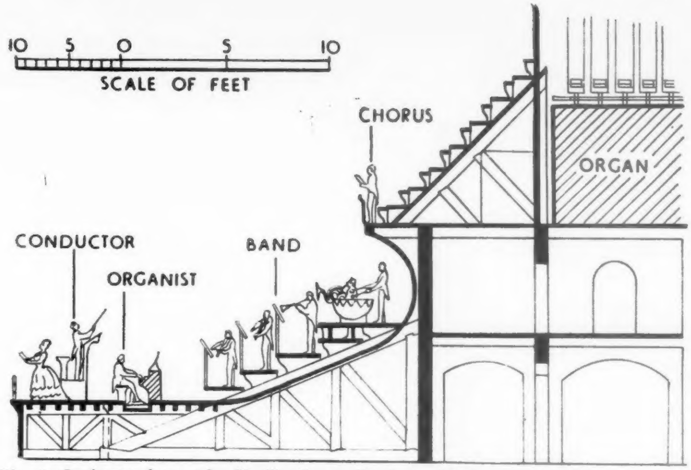


Fig. 1: Orchestra layout by H. Heathcote Statham. 1872

I. SURVEY. In the early seventies of last century, after the opening of the Albert Hall, a period of heart searching in acoustics began, and H. Heathcote Statham [*F*], musician and architect, and later editor of the BUILDER, read a paper before this Institute called 'Architecture practically considered in Relation to Music'.* This is today a useful contribution. He recommends the rectangular hall type with a good slope or 'ramp' for floor seats and points to the old Exeter Hall as a model. He also recommends the use of a floor reflector in front of the platform and shows an interesting scheme of his own embodying these recommendations (Fig. 1). Later in 1899, in a 'Note on the Planning of Concert Rooms', he warns against the danger of the curved rear wall, and again recommends the ramped floor. 'Most of our concert rooms,' he said, 'are an expansion of the old ballroom model with a flat floor for dancing and promenading and an orchestra for the players up above and out of the way.' This historical point I shall recur to. But if we now turn to Sir Percy Thomas' paper, 'Planning of Municipal Buildings' section Assembly Halls (R.I.B.A. JOURNAL, February 1935), we again find a clear recognition that the level floor is not good for auditorium purposes.

This takes me at once to the heart of the subject from a design point of view. It is still the complaint of the acoustic expert and of the informed architect. Today in this country the number of public halls designed primarily for musical tone—halls in which music *rules*—are few. It is the town hall, the assembly rooms, the college hall, which provides the general music auditorium, and there the flat floor rules—the flat floor for dancing, banquets, exhibitions, and much else besides. And so we must classify. The first and by far the more numerous class is the 'general purpose hall'. The second is the concert hall proper.

As to the first; the Local Government Act 1948, Sec. 132, authorizes local authorities to provide entertainments and charge the cost to the rates up to an amount not exceeding the product of a rate of sixpence in the pound. This has not quite dawned yet, but they are empowered to influence the home of our entertainment considerably. Couple with this the thoroughly bad auditorium performance of the older flat-floored town halls and we discover certain tendencies. We must anticipate the undertaking by local authorities of a small municipal theatre in addition to their large hall as at Wolverhampton (Lyons and Israel) or the replacing of the older hall with a better kind of general purpose hall as at Poplar (Fig. 2). Now there is a great deal to be said for taking drama out of the big hall—drama is more vulnerable in a large hall than music, and a simple theatre with ramped seats can be most suitable for amateur productions. But a warning is necessary: the two halls must be dissociated structurally if they are to be let separately, otherwise the noise of rehearsals or of knocking up scenery—very difficult to insulate—will interfere with the separate lettings, and this means they can not be used en-suite for mayoral receptions. Note also they must be on separate heating circuits.

But questions of cost must weigh against two halls and we have to note in Poplar Town Hall, designed by Mr. C. E. Culpin (opened 1938), an attempt at a better compromise for a large hall. It is a theatre on plan and fan shaped; the front half of the floor is flat for dancing, the back half ramped; and for music there is a bow-shaped fore-stage able to take violins and soloists *in front of the curtain line*. I can not pursue the general purpose hall tonight further than to make clear how music can be greatly helped by a wide proscenium opening (to be narrowed by curtains when required for drama) by a fore-stage for strings and soloists, and by a hard cyclorama, or white-washed rear wall, which can be illuminated, and will then dispense with a thick curtain as back cloth. What musicians dislike, of course, is the reversing of all good acoustics principles which occurs when they find themselves on the stage muffled in curtains and drapes while an echo follows their high notes from the relatively reverberant hall. Mr. Boyd Neel has publicly denounced these conditions. In fact it would probably be better, if no *fore-stage*, to play on the floor of the hall and put some audience seats on the stage. Sir Adrian Boult has recommended that when a theatre is used for concert music the safety curtain should be lowered and used as a reflector and a temporary fore-stage provided for players.

Taking the concert hall proper we have first to consider the requirements, and behind the requirements the active musicians and critics and behind them the musical public, and behind all the economic situation. Briefly we have facts like these. There is a growing demand for powerful orchestral music. As architects we have to note that cities which have built and preserved good halls, which have not converted all their theatres into cinemas, nor pulled down buildings of historic interest to provide sites for chain stores—cities in fact which have preserved their character and beauty—can now hold musical festivals and reap honour and considerable profit. At the same time there continues the old reverend love of familiar choral music—of Handel, Bach, Mendelssohn, Elgar—which has increased with the increase in population and with real education in music so that the Messiah and The Passion Music are more demanded; but there are very few suitable places for the proper hearing of large choral works by large audiences. Then we are told that owing to the salaries of orchestral players no concert hall seating less than 3,000 will cover the expenses of a performance, but of course we have no money to build even moderate sized halls. Then the critical standards of the large new public are not high—it is enough for them if the excitement of the crescendo is communicated—vibratory experience, sheer loudness. But when we come to the requirements of the musical critics things are different. Indeed we should remember with respect and humility that the critic may have heard the Fifth Symphony some 100 times in a hard working life, and should ask ourselves what *he* has come at last to require of acoustics. Since he goes often he may suffer often. He does not like loudness for its own sake; he wants good definition

* The Statham papers are Trans. Vol. XXIII 1872-3, Sessional Paper as above, and the Note as above Jan. 1899. Sessional Papers by Roger Smith in 1860-1, and Burrows in 1895, not of much value. In addition to Sir Percy Thomas' Sessional Paper as above there are articles in R.I.B.A. JOURNAL as follows:—By H. Bagenal, *Designing for Musical Tone*, Oct. 1925. *The Leipzig Tradition in Concert Hall Design*, Sept. 1929. *Concert Music in the Albert Hall*, Aug. 1941. By W. A. Allen, *The Acoustics of the L.C.C. Concert Hall*, Aug. 1949. There is also a useful anonymous note on *Concert Hall Platforms*, May 1936. The discussion on concert hall acoustics held by the Acoustics Group of the Physical Society is reported in R.I.B.A. JOURNAL, Dec. 1948 and Jan. 1949. See for further references 'Concert Halls,' R.I.B.A. Library Lists.

in a hall because he knows the critical passages and must follow them. But also he is sensitive to other things: and I would recall here the honoured name of A. H. Fox Strangways and a remark of his about a performance in a particular building that the violin parts were 'heard like silken threads instead of cotton'. Then we have our English composers—fertile and experimental and by no means afraid of sheer loudness. We have a growing school of music scholars always pushing back our horizon and discovering antique genius needing a special kind of performance. We have the B.B.C. steadily educating and raising standards. We have fine conductors. who both serve and lead us (and we are specially grateful to them and their players for their work in the war—continuously refreshing us with great music in the midst of the conflict) and a good crop of talented executants, but always the demand exceeds the supply and if the demand were met then there would not be nearly enough places for musical performances.

Such is an analysis: it is both hopeful and despairing. The talent and will is there. Who shall integrate it? To design a concert hall is to go down into the arena and risk death from the violence of your contending passions, yet there are many here tonight who would take that risk. To answer the need, to respond to the form and pressure of the time, and discover a unity; to do a building which shall give the clue to a harmony and coherence—is what the architect—bound hand and foot—is still waiting to do.

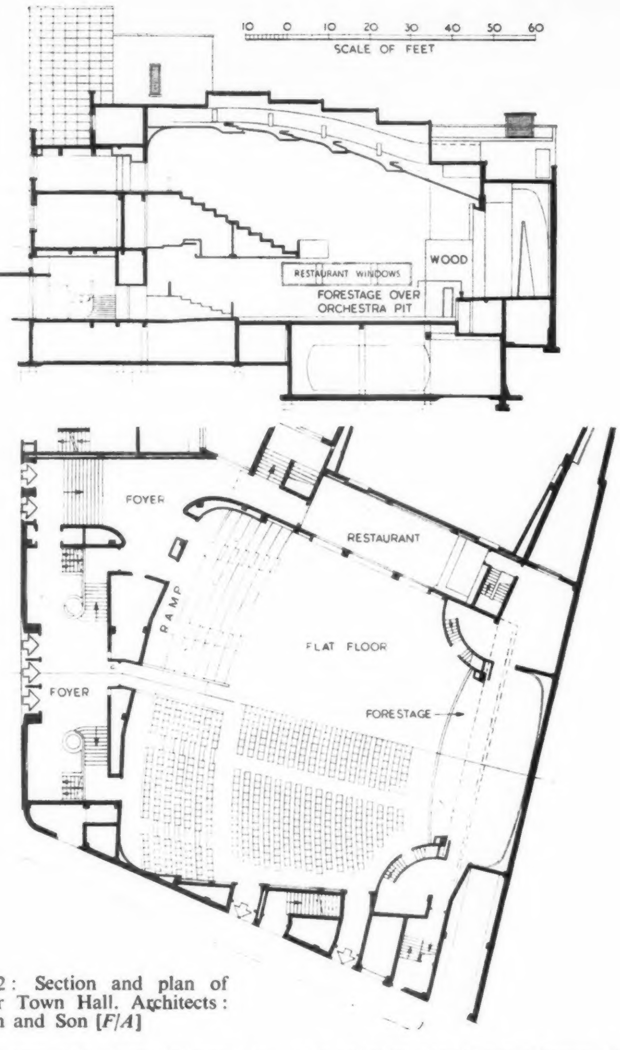


Fig. 2: Section and plan of Poplar Town Hall. Architects: Culpin and Son [F/A]

II. MUSICAL TASTE AND CONCERT HALL TYPES. There is no doubt that for some musical purposes we want the larger modern hall seating 3,000. But not for all purposes. This needs consideration. In discussing these problems we have before us the results of the useful meeting which took place last year, at the instance of the Acoustics Group of the Physical Society, at which acoustic men met musicians and critics and some consent was arrived at. Consent is more important to architects than interesting opinion and I shall often refer to the report of this meeting published in R.I.B.A. JOURNAL, December 1948 and January 1949. I said then that owing to variations in loudness there was a real distinction to be drawn between the acoustic conditions suitable for classical music with forces of 40 to 70 on the one hand, and very loud modern works with forces of 119 or more and with full complement of brass on the other. The reason for this is a practical one. We want the right volume of sound for the right size of enclosure. The large hall is suited to the large and loud modern forces. But the smaller orchestra in a large hall loses power and loses touch, and will not easily communicate excitement. Also the *piano* and *pianissimo* tone of violin, oboe and the human voice tend to become inaudible. This was supported at that discussion by Mr. Karl Rankl who added that the same applied to forte and fortissimo—'if a hall was too big the brass fortissimo would always drown strings and woodwind'. From this there follows the fundamental need for two sizes of hall: and Mr. Rankl suggested that if, for a particular concert programme there should be a demand for 10,000 seats, the right thing to do would be to repeat the concert four or five times. Now this is a radical suggestion put forward to answer the argument that the hall of moderate size, seating no more than 2,000 is economically not workable. I would add to it my own belief that the moderate sized hall is highly desirable for a healthy musical life and that it would be wrong wholly to transfer musical activities from a number of moderate halls to one or two very large halls. Therefore let us make it clear that two sizes of hall are wanted for two acoustically different types of music, and that in all cases a deep overhang upon a flat floor is wrong but specially for soloists and for violin concertos. Now this concerns architects acting as assessors. Trouble always springs from a building committee wanting to crowd too many seats on the site. Hence come about the long side galleries, the deep overhangs, the small cube per seat and the consequent too short reverberation when the hall is full. If we are to preserve our standards—let alone improve them—this tendency must be withstood. The practical answer on the confined city site is the *opera house plan* in which relatively shallow tiers are placed one upon another and a good floor reflector sends sound upwards. A good example of the type is the Usher Hall, Edinburgh (Fig. 4).

There is another important distinction to be recognized. It is in regard to musical taste, and it influences design. There are two broad schools—those who in all their preferences draw upon choral tone for a standard, and those who draw upon instrumental tone. The test is their attitude to *tempo*. The former will willingly go a little slower for the sake of 'fullness' of tone—a something *sustained*; the latter must have rapidity with exquisite precision—they will not go slower—the enchantment is that of something infinitely organized moving at great speed. They want brilliance and

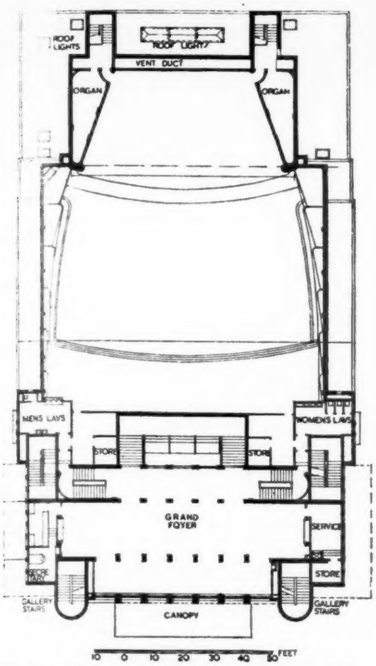


Fig. 3: Philharmonic Hall, Liverpool. Architect: Herbert J. Rowse [*F*]

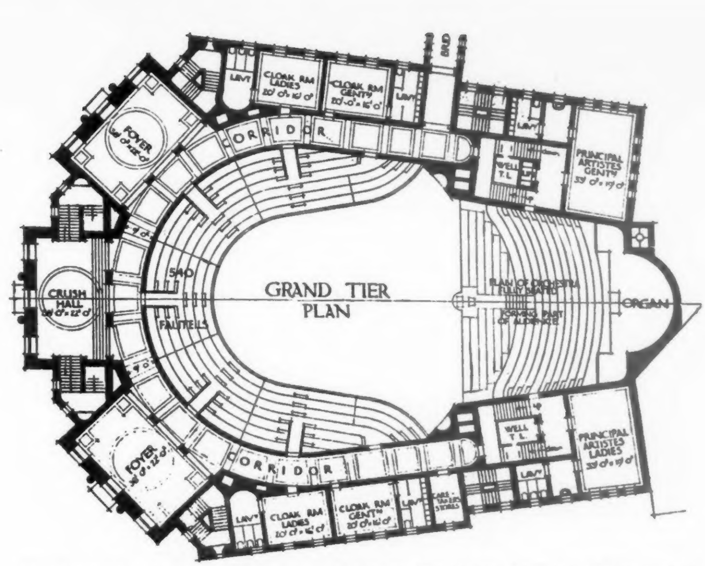


Fig. 4: The Usher Hall, Edinburgh. Architects: Stockdale Harrison [*F*] and Sons and H. H. Thomson [*F*]

sparkle rather than 'fullness'. The two schools go back—the one to the church, the other to the early opera house. Of course, there has been considerable exchange between them, but our recent enquiries show these two broad preferences are strong today. And roughly speaking the choral school prefers the older type of hall with a longish reverberation such as the old Liverpool Philharmonic, the St. Andrew Hall, Glasgow, and the old Colston Hall, Bristol. The instrumental school prefers the new Liverpool Philharmonic, the Usher Hall, Edinburgh, and Covent Garden, in which flexibility, sparkle, the clear staccato, and a short reverberation are the characteristics.

III. AUDITORIUM DESIGN & ACOUSTICS. Let us look at the consents reached in the Acoustics Group meeting. The circular planned hall (called 'annular plan') was condemned on a number of counts: let there be no mistake about that. Next the circular rear wall of long radius was noted as dangerous and to be avoided, and this is supported by American and by Danish designers. But here we confront a strong planning tendency namely to strike the seating lines on a fan-shaped plan from a centre on platform and follow these by curved risers, parapets, plinths, and finally by the rear wall. But this is asking for trouble. The one disabling defect is a return of slightly focused sound giving a 'grunt' or 'slap back' when a certain tempo is reached. And you can put an efficient absorbent on a curved rear wall and still get an echo from it. If the fan is narrow it can quite well take straight riser lines. If a wide fan, the safest method is to have three straight facets for risers, and for rear wall if possible a long centre straight with breaks at each end. Both diffusing and absorbing treatments are easier to mount on straight facets than on a major curve. In my view applied cylinders and convexities on a major curve are not an insurance against echo if the total reflected sound should be gathered back to front seats by smooth unbroken splay wall and ceiling surfaces. A good absorbent on straight facets and a breaking of side splays is the right treatment. The extreme risk is connected with long radius curvature: there is less risk in the horse-shoe or old Queens Hall plan where centre of curvature is well advanced. But in all smooth wall and ceiling curvature there is focusing and not distribution and therefore some risk. This risk has been concealed in the past by the Baroque tradition of deep relief. 'Theatre ornament' was functional: so was the column and break. But this tradition has gone and no equivalent safeguard has taken its place. Curved planning in the open air, that is, not under a roof, is less risky.

On the positive side—we find a general acceptance of the desirability for good definition and for the ramped floor and well stepped seats as contributing to that end. There is no doubt that the existing very common platform seating arrangement which screens from the audience on floor the weakest instruments (violas and woodwind) and exposes the noisiest (brass and percussion) is wrong. The ideal objective is for members of audience to see each instrument, because that means each is getting the direct-path ray from every instrument and it is the direct-path ray which, in the first fraction-of-a-second of the note, delivers the full frequency components, including the transients and upper partials, so necessary for definition and for quality. Now if you can get a good *registering* on the ear of that first fraction-of-a-second you can stand a longer reverberation or background tone with its contribution, and can still follow rapid passages. At the meeting referred to there was general acceptance of the new Liverpool Philharmonic Hall (Fig. 3) as on the whole giving satisfactory definition. But Sir Malcolm Sargent wrote that it 'was actually better at rehearsal'. This means of course that it would be improved by a longer reverberation *when full*, and need not thereby lose definition. That is also my own view.

There, roughly, is the architects' problem. We have reached the first step. The evidence seems to point first to—definition as the modern demand; and second that if, without sacrificing definition, we can give some fullness, some 'choral' quality to strings, we ought to do so.

How then set about it? Of course a large number of things weigh in practice. The site is the first. If a wedge or fan-shape is an obvious solution then accept it with its disadvantages, and take measures against its risks. You will get good sight lines: you will get good sound reflectors outwards: but these reflectors will tend to gather returning sound as I have shown. But you will not then get random inter-reflection with smooth reverberation: you are forced to provide, for safety's sake, theatre conditions rather than true concert hall conditions. I have noted also that on a confined city site a frank return to the opera house plan with superimposed shallow tiers going up high and a good floor reflector (Covent Garden in front of the safety curtain) is legitimate, but this too will have the theatre character acoustically. But if on the other hand the site gives you easily and naturally a good rectangle, then accept it. It, and not the fan, I believe, to be the scientific shape for music. But resist the demand for over-seating which leads to heavily projecting galleries. A projection should not cover more than six or seven rows.

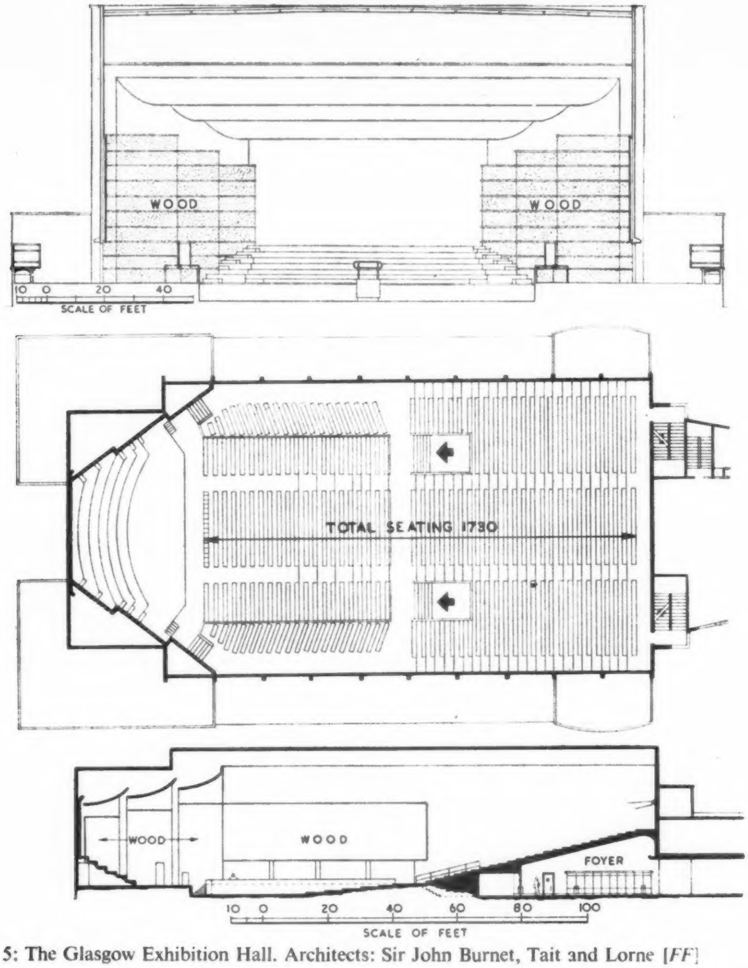


Fig. 5: The Glasgow Exhibition Hall. Architects: Sir John Burnet, Tait and Lorne [*FF*]

The cube per seat should be large—some 250 cu. ft. per seat or more—and this demands height: a good reverberation can then be had. (Dimensions of the old Liverpool Philharmonic by Cunningham is given as 102 ft. by 135 ft. on plan and 68 ft. high.) Now a city with a fine choral tradition, like many Yorkshire and Lancashire towns, is better served with a rectangular and more reverberant hall. Also I must point out that in London we have no large hall suitable for, or worthy of, the Matthew Passion Music and the B Minor Mass, that is to say, one giving modified church conditions, in which there is 'fullness' of tone for the choir and also definition *at moderate speeds* so that the instrumental parts can be clearly followed. That double role is the test. The difficulty is that the long flat floor causing rapid loss of sound intensity over heads of audience will not give good definition for strings placed behind the platform front row, nor for wood-wind. If a rectangular hall can be given an efficient floor ramp, well and good. If not, and if floor seats on the flat extend in below the gallery, then some shaping of the platform walls and ceiling, in order to give useful near reflections, becomes in my opinion essential. By suitable splays enough reflected sound can be directed upon all rear seats to give an efficient increase in loudness. It is specially desirable thus to reinforce violas located on the centre flat, and all string tone, including the solo violin in concertos. But a canopy line should not constitute a large concave profile because of the danger of its collecting long path return sound and sending it to the platform as an echo. For this reason I recommend a canopy in a series of convex facets. This method has proved successful at the Glasgow Exhibition concert hall, and in the Albert Hall. Mr. T. Somerville holds that in a good rectangular hall, properly broken up as in the St. Andrews Hall, Glasgow, reflectors are not required. In so far as choral requirements are concerned I agree; but I have still in mind the delicate string parts in Bach's choral works—*parts*, not accompaniments—and believe that the canopy is necessary to insure that these shall be well heard in rear seats.

In the matter of plan shapes, I believe the stepped plan will give both the opening out, and consequent larger seating, of the fan-shape, will also give random reflections and consequent free reverberation, and does not ask æsthetically for the curved seat risers and curved rear wall. I therefore recommend this plan.*

The main ceiling of the hall is a useful reflector at centre and rear. It can help the top gallery, and a top gallery should not be divided overhead by a deep beam from the main ceiling. The ceiling itself should not be too deeply coffered or its efficiency as a reflector will be reduced. But a hard ceiling over front seats and over floor reflector is not desirable and an absorbent portion here is an insurance against risk. The floor reflector in front of the platform is agreed to by musicians, and a marble strip some 10 ft. wide free of seats is embodied in the new L.C.C. Concert Hall. With a good ramp to auditorium floor it is clear the height of the platform above it can be reduced considerably.

We now have some elements giving characteristic shape. There is the opening out plan stepped to give breaks, and providing a wide straight gallery at rear. The floor reflector slightly removes the ramped seating and dissociates the orchestra. The platform splays can either be returned overhead as at Worthing or Hastings (C. C. Voysey) or a canopy can hang free as at the Glasgow Exhibition Hall (Sir John Burnet, Tait and Lorne) (Fig. 5). Alternatively we can build a large oblong hall with shallow galleries and with recessed walls, and at the platform end put large wooden screens not reaching the full height. These and a large part of the platform staging could with advantage be adjustable to suit different sizes of orchestra. We should then in effect have a hall with a studio at one end.

IV. ABSORBING AND DIFFUSING TREATMENTS.

The audience absorbs predominantly at middle pitch and in a full hall, carpeted, it is not always easy in practice to get middle pitch reverberation as high as is desirable for musical tone. Hence the minimum of applied absorbents to insure against echo may be all that is required in a well-designed hall. But it is different in the lower frequencies. Bass absorption in normal structure is given by the diaphragm action of suspended ceilings, by board and batten floors, and thin partitioning. Where this is absent, and when solid floor and concrete roof occur in the same hall there may be boom (in a church it is very common not to be able to distinguish the bass parts in a rapid organ fugue). Hence bass absorption must be provided and controlled. But where the common suspended ceilings and linings occur in large continuous areas the diaphragm action may cause resonant response at a peak like Liverpool Philharmonic at frequency 110 cycles (the 'bass drum' tone). This means that all diaphragms should be subdivided. We have to get away from the smooth tunnel interior of plaster on continuous metal lath and think in terms of panels and breaks. For purposes of absorp-

* See R.I.B.A. JOURNAL Dec. 1948. Fig. 1, p. 71.

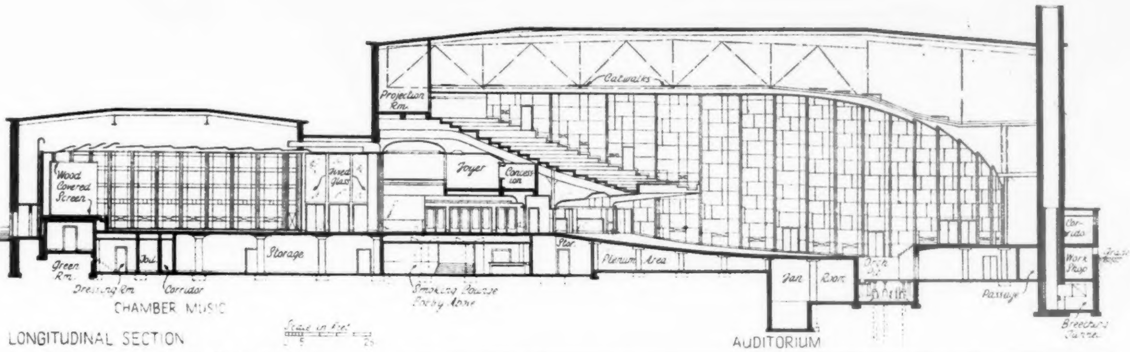


Fig. 6: Kleinhans Concert Hall, Buffalo. Architects: F. J. and W. A. Kidd and Eliel Saarinen

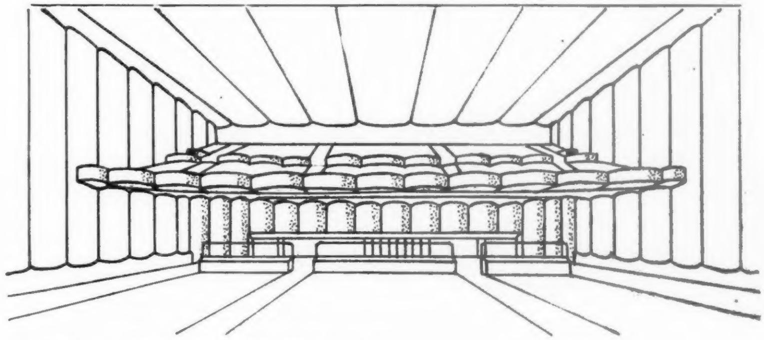


Fig. 7: Diffusion treatment in an American studio

tion the perforated plywood panel gives an adjustable material. They must have an air space and a wool or quilt behind them and should vary in size or in rigidity. Without perforation they absorb in bass, with perforation in bass plus middle. The L.C.C. will now permit wood panelling if certain fire precautions are taken. Alternatively lime plaster on wood lath, in separately framed areas of different size is useful for bass absorption; and smaller areas for thick fabric or wool treatments could be left between to give the middle pitch absorption. As to high pitch absorption this is largely supplied by the action of the air in the hall and by normal matt surfaces. Hence the demand for rubbed or glossy surfaces at the platform end of the hall; and the avoidance of porous absorbing plasters which absorb mainly at high pitch.

The reverberation at all frequencies should give an even 'decay curve' without noticeable maxima and minima and should not change pitch while dying away. This requires some free inter-reflection between opposite surfaces—that is to say between floor and ceiling as well as between wall and wall. Hence it is useful to leave large uncarpeted gangways in addition to the floor reflector. The tendency in recording studios now is to distribute sound absorbents in a proportion over the perimeter of the enclosure and thus get enough inter-reflection, but not too much, and get an even decay curve. In a concert hall to concentrate absorbents on rear wall and floor only is to limit inter-reflection to side walls only. We want for concert halls relatively more on rear wall and on front sides (and front ceiling) to prevent echo, and relatively less elsewhere. The theory is to permit inter-reflection and control it. This method of distributed absorption must influence interior decoration. Either a frank pattern can be acknowledged or in some instance a thin net has been used to mask variations of material.

Deliberate diffusion is needed for dangerous focal areas: we must note the use of a diffusing treatment in the new Albert Hall dome by means of which the velarium (after some 80 years) has been successfully removed by Mr. Steele and Mr. Cullum. Before the war the wood-wool firms supplied a ribbed board giving convex half cylinders which could be plastered or left absorbing. This useful material should be revived. Larger waved areas can be made out of expanded metal. The convexes are more efficient than the zig-zags. For an example of an American studio showing diffusion treatment, see Fig. 7. I would also call your attention to the Royal Hall at Harrogate (Fig. 8) a festival hall used for every purpose, but with a distinguished music tradition. It combines a dancing floor with a ramp and has interesting convex plan lines.

The desirable relative reverberation at bass, middle, and treble—called the 'reverberation frequency curve' is still controversial yet yields something to common sense. It should be such as insures with full audience a rough balance of tone, so should be without bad peaks or dips at a particular pitch. Where the loudness sensation of the human ear does not vary much with pitch, namely between 500 cycles and 3,000 or so, the curve should be level. For a large hall reverberation should be about 2 sec. with full audience. The Liverpool Philharmonic is about 1$\frac{3}{4}$ sec.; the St. Andrews Hall, Glasgow, is about 2 sec. Bass reverberation may be somewhat longer and no harm done, but the slope down as from 100 cycles should be gradual and smooth. In the upper frequencies, above 3,000 cycles, if the reverberation can be maintained level with the middle band then string tone will have more brightness: but the absorption of normal materials at high pitch tends to bring it down. The measuring of actual halls by the B.R.S. and B.B.C. with full audience, as well as empty, and at the same time careful assessment of their musical character will give us further information as to permissible variations.

V. PLATFORM PLANNING. Since conductors profoundly differ, the ideal platform should give maximum flexibility, and this aim has caused in America—as in the Kleinhans concert halls at Buffalo (Fig. 6)—the wholly flat platform for all instruments. The conductor can then group them as he likes. But still the front row will screen the rows behind. In my time the complaint was always that 'cellos and double basses were not heard and had to be increased in number and from that point of view I approved the new arrangement by which the 'cellos were placed at the front, on conductor's right, where the second violins used to be. By this new arrangement the second violins now come on the left behind the first violins. Sir Henry Wood himself adopted this arrangement and gave good reasons for it.* He formulated a principle—'Endeavour to get as many F holes of your string players as you possibly can to face the conductor and public.' (*The Orchestra and its Instruments*, page 2.) On the older principle the second violins on conductor's right had their F holes turned away and instruments screened by left arm. Now Heathcote

* 'When the 2nd violins are placed on the conductor's right the ensemble at once becomes more difficult for it is almost impossible for the conductor to control the long straight lines of players. The latter should be in his full view, whilst he should be able to see the bowing and look into the eyes of each individual performer. . . . In a performance of such a work as the introduction to Act III Tristan and Isolde, with the 1st and 2nd violins grouped on the left the difficulty of ensemble vanishes and the 2nd violins can *hear* the 1st violins' (ref. as above). Also I believe an equally strong reason is the demand for massed 'cello tone, difficult under the old arrangement.

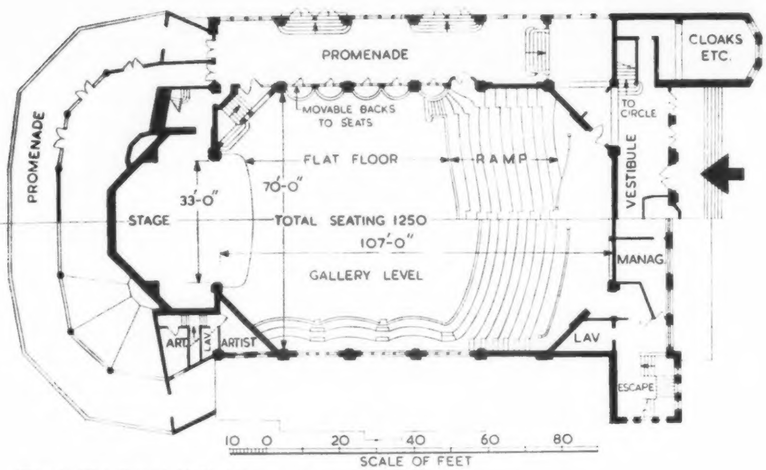


Fig. 8: The Royal Hall, Harrogate

Statham showed on his arrangement of platform 1899 and earlier—not only the violins divided but also the 'cellos and double basses each of which were placed half on one side and half on the other. That was the 19th century tradition. But it had a difficulty not disguised by Statham, namely, the *ensemble* playing of the separated same instruments. But when a good ensemble was achieved this older method gives to the audience a balance of string tone now lost. Also when the first and second violins are together on the same side you can not get that call and response between fiddles—that delightful conversation across the floor—with the fun that goes with it. Mr. Allen has in fact noted the added 'interest' that comes from the occasional shifting of the aural focus. One might sum up by saying that the new arrangement makes things generally easier for large forces on wide platforms. It is interesting that Sir Adrian Boult adheres with conviction to the older arrangement. From the designer's point of view the interchanging of 'cellos and violins, on a flexible stage, would mean the planning adjustable risers. A pair of violins with stand occupies an area 3 ft. by 4 ft.; but a pair of 'cellos with stand needs 4 ft. 6 in. (minimum) by 7 ft. 3 in. (Note that if sockets are provided along the nosings, a shallower tread—4 ft. —could be used.) Sir Henry Wood took the old Queens Hall 'flat'—56 ft. wide and 12 ft. deep as a kind of standard, and got on it comfortably all his first violins (18), all his 'cellos (16), a harp, a grand piano, and 10 of his 16 violas. But violas and harp are badly screened and we should now recommend a low movable riser at the back of the 'flat' to take the violas. We should think of the platform plan really as a wide wedge with conductor at the apex. This is best realized from Wood's diagram of an ideal lay-out (Fig. 9). A conductor ought not to have to swing round through 180 degrees. From this has come the 'bowed' or splayed front in the concert hall tradition. His desk should be movable because different conducting positions may be taken up as for a symphony, a choral work, a piano concerto. The choir staging should either be a curve with (roughly) the conductor as centre, or three tangential facets; the straight, or wide chord, is poor planning. It means that singers on extremities must turn from their scores and look half left or right. They need to look over their scores at him.

Now Heathcote Statham in his recommendations and designs insists on all the instruments being on risers and the flat kept clear. (See Fig. 1.) Clear except for conductor, soloists on a projection of their own in the front, and the organist at his electrically controlled console at the centre. There are two important things to say about this. First this keeping the flat clear makes it a most useful floor reflector for violas and woodwind. I believe Steinbach about 1906 at Queens Hall followed this arrangement. And Statham adds a plea also for a parapet as a backing for the orchestra and to divide it from the choir. I am in favour of this myself; it can be seen at Birmingham Town Hall. But it interferes with flexibility. Second—'the organist', he says, 'must always be placed below in front of the whole orchestra'. And we have here the logic of the great 19th century oratorio tradition. The Exeter Hall taken as a model by Statham—largely on account of its ramped floor—was the home of oratorio. In 1847 Mendelssohn conducted four performances of the *Elijah* there. Also it was the great age of the organ. Those stencilled pipes arrested the eye and formed the focus of the hall, and the public would attend four-hour organ recitals. (For this and other facts, see article 'Organ' in the *Oxford Companion to Music*, edited by Scholes.) Later in the century organs were specially designed to imitate the instrumental parts of Parsifal. Oratorio and the organ were linked. The organist could give body tone to the orchestra or he could and frequently did perform the whole of the accompaniment to the choir. Now for architects organs have been a great trial from earliest times. Let us look at this great *occupant* and ask ourselves whether it is a mere idol or whether it is a real contributor today to concert hall music. In the concert hall it goes back to the Commonwealth period when organs, turned out of churches, were installed in taverns and coffee houses and used for secular music. Then began the age of music clubs, and hence dance music and pub music mingled with religious music in our respectable origins. But apart from Handel's organ concertos, the oratorios, the Passions and the B Minor Mass, the number of works needing the platform organ are small—Brahms' 'Requiem', Parry's 'Blest Pair of Sirens', Vaughan Williams's 'Job'. What others? Also there have always been people who disliked the mixture of organ and orchestral music. In any case it is only the diapason stops which are of value because the other stops can be better done by their counterparts in the orchestra. Today the placing of the organ presents new problems. Under no circumstances is it possible to get *capella* tone in a large hall with reverberation short enough to give brisk orchestral playing. The tone must penetrate some 160 ft. across upholstered seats so that increased wind pressure is necessary and the organist must have strong forced tone. At the same time the rear wall of platform is highly desirable as a reflector for the choir, and orchestra. I believe that today a much smaller instrument is required giving good diapason tone, with a moderate number of stops, with good speaking pedals, but not with the enormous complication of modern first-rate instruments. But we have here to face a fact perhaps as important as any other, namely, that owing to our general poverty choirs may want to experiment with works in large halls without an orchestra and with only the organ accompaniment, as is frequently done in churches. But then the position of the organ is important. They will not, in my opinion, want it behind them; but would far prefer it set further forward—as for instance above and behind the wall splays, or side screens, of the platform recess. It would be possible to get some 24 ft. opening above a 10 ft. plinth on each side, the instrument being divided. All this needs thinking out in the light of new requirements.*

VI. CONCERT HALL LIGHTING. This has so much influence on function and on design that we must glance at it. First the musical scores on players' desks must be well lit, but not over lit. Players must not be blinded under inquisitorial floods as in the cinema studio; nor must they get a spotlight in the eye from the auditorium. Also the audience want to follow miniature scores, and to read the words, nor must this be ignored. What illumination is desirable? Some photometric standards are found in the I.E.S. Code. A recommendation of seven foot-candles has been made for casual reading, and 15 for sustained reading. We also find that public halls and churches are put at seven foot-candles presumably at desk level. Therefore seven foot-candles is ample for the audience, and less

* For planning of cinema type organs in special recesses see Sir Percy Thomas op. cit. p. 480.

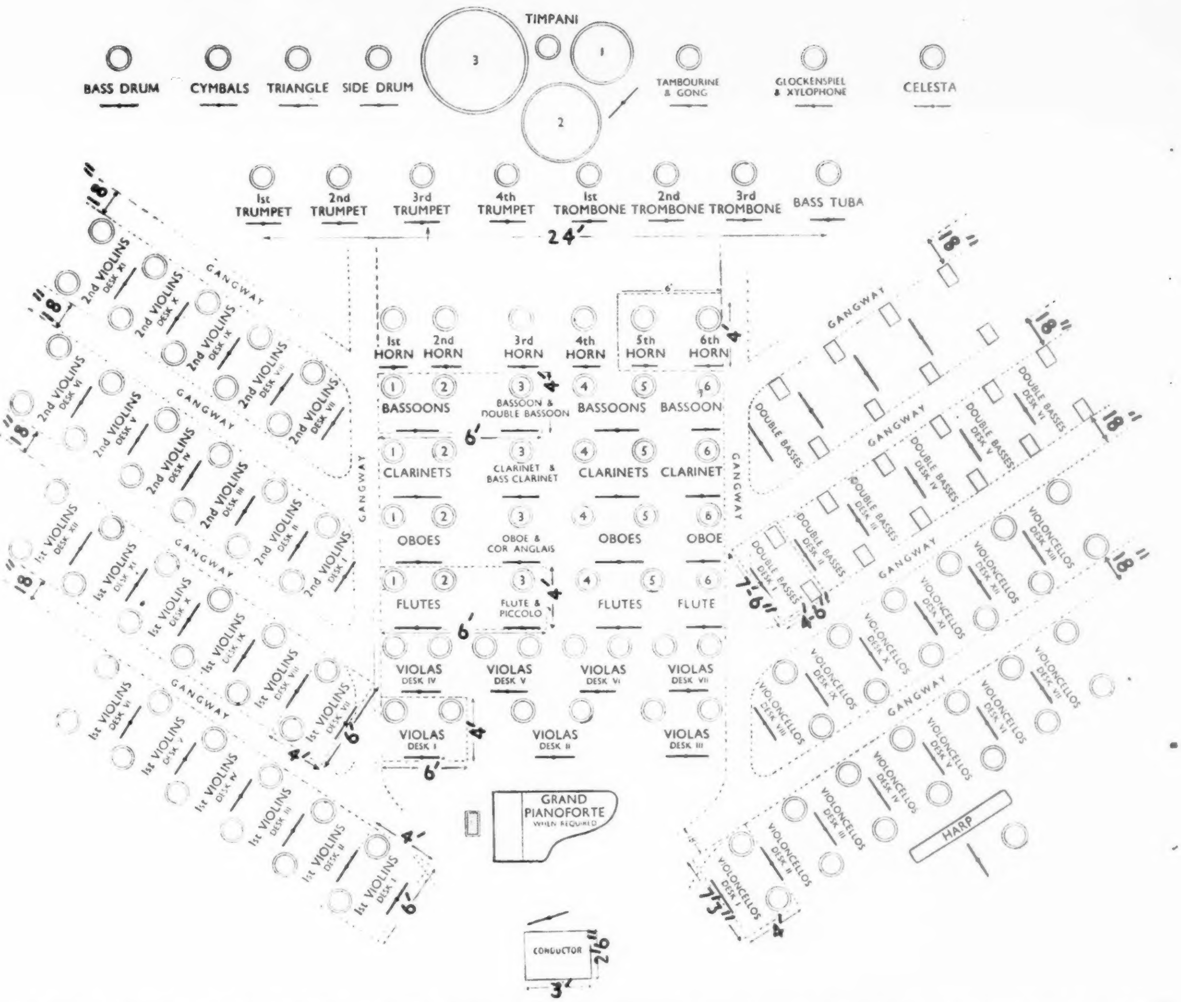


Fig. 9: Orchestra layout by the late Sir Henry Wood, showing the essentially wedge shape which the lines of orchestral players will take up

would serve. For platform lighting 12 to 15 f.c. at musicians' desks is desirable, although instances as low as 6 to 8 f.c. could be quoted.* We here touch a matter of taste, namely, how far, while playing, to subdue the auditorium and bring up the platform. I personally can not but recall the kind of lighting which one might call 'homely'. Hall and platform were unified by a series of lampshade pendants giving large luminous shapes under which our conductor, and our musicians, moved in a light that one might describe as *sub specie aeternitatis*—music and lamplight and familiar figures mingling. It is with such lighting that the contemplative power of great music is associated for me. In the St. Andrews Hall, Glasgow, pendants of this kind—made more powerful—survive. The modern—more efficient—method is to use 1,000 watt arena lanterns with narrow angle reflectors and with louvres. These, by restricting the area illuminated to some 27 ft. diameter, can give as much as 9 f.c. from a ceiling height of 80 ft.* This method gives a powerful sourceless light endowing the scene with impersonal interest and leaving the walls relatively dark. This modern method can be regulated by dimmers, and with this instrument to hand it is natural to lower the auditorium illumination during playing. And in the intervals it is natural to change the character of the lighting from the contemplative to the brilliant, the sparkling, the sociable. This could be done by specially designed pendants embodying different types of source.

The conductor must be well seen by his players—both as to his baton and his facial expression. Top lighting alone tends to over-emphasize top of head, nose and chin, so that some diffused light is desirable, and this can easily be given by canopy reflection or floor reflections. An advantage of the modern lighting which leaves walls dark is that the conductor is well seen by his players against the auditorium. When conductor and soloists are 'taking their bows' some spot lighting upon them is now often provided.

To return to the category of the contemplative—one asks what is it that the eye should rest upon during the music? Here I believe a moderately illuminated cyclorama—as in the Worthing Hall—is a contribution. It gives the effect of distance—a peaceful void instead of some insistent or teasing object. It has the same rationale as apse in church design; and by intelligent lighting the interest can be varied. But this must be done carefully; the orchestra must not be silhouetted against the cyclorama nor must they cast shadows upon it. It needs to be lit by floods top and bottom at some 4 ft. distance. I have noted above the acoustic advantages of the cyclorama. From what I have said it is clear that indirect lighting only will not do the job: it is uneconomic.

When we turn to the general purpose hall, in which concerts are only one of the

* If the lanterns used have a glazing of any kind below them, it will not be easy to maintain a high intensity owing to dust collecting on the glass.

* These figures are the results of tests by the Strand Electric and Engineering Co. in one of their narrow angle reflecto s (20 degrees). The medium angle reflector (44 degrees) at 40 ft. height gave 8½ f.c. with a coverage of 23 ft. diameter.

uses, we have to recognize that here the lighting must be variable in character. An exhibition of pictures will need the directing of light on the side walls; a hall will need the sparkle of the chandelier; a banquet some lamp-shade effects. This leads again, and even more clearly, to the ingenious fitting embodying flood, corona, and chandelier, with separate switches for each.

VII. **PLANNING IN DETAIL.** The chief *new things* in connection with the modern building are—the use of the hall for broadcasting and television (it becomes a studio); a considerable expansion of circulation and foyer space; very much more accommodation for musicians and for rehearsals; clear distinguishing of box office from entrance vestibule; and lifts (which must not be noisy) to upper floors. There is the bird's-eye view. For detailed planning I am permitted to draw upon a valuable programme of ideal requirements drafted as a study for the new South Bank Concert Hall, by Mr. Edwin Williams [*F*], Senior Architect of the L.C.C. staff.

Foyer Space. It is thought that up to 70 per cent of the audience may, in the 'intervals' be using foyers and circulation at one time. Therefore foyer space should be disposed round the perimeter corridor, and if possible each foyer given its own refreshments service off the line of general circulation. This principle in practice may give something different from the very large single foyer (on the *piano nobile*) together with relatively narrow corridor. The South Bank Hall has on upper floors a number of foyers and promenades and a gallery on the river side together with a 'sunk foyer' under the hall.

Foyers and promenades are likely to prove noisy, they should be carpeted and be trapped from the hall. This also reduces draughts. Also approaches to 'management', and other executive offices should be separate from the public circulation. Call boxes are now universally demanded. Exits should aggregate one third more than approaches.

The Box Office Section must take account of publicity and needs a good booking hall with illuminated seating plans, and with racks for leaflets and advance programmes. This booking hall should be a separate entity with entrance from the street and must not interfere with main entrance and main approaches. The box office itself often has in it large sums in cash—it is a treasury, a strong room, and needs to be designed to give protection against surprise and violence. That part of the box office adjoining the booking hall will deal with cash bookings: for a large hall at least three cash desks for current and future performances will be required.

Back Stage Section. The planning here hinges on surveillance by the doorkeeper, (as in a theatre) of all access from street to back stage and principals' rooms and offices. This section must have a crush hall, and in addition to a good office for the doorkeeper, offices and shops are also required for fireman, carpenter, night watchman. A telephone exchange is necessary. Coupled with this there is a proper locating of the loading dock for vans 12 ft. 6 in. high, and large goods lift to take the maximum dimensions—9 ft. 6 in. by 5 ft. 2 in.—of a grand piano. A complication in this section is the providing separate access and escape for the public admitted to rear platform seats—favourite seats for music students.

The Instrument Store is an important unit. It must be near the goods lift yet shielded from external humidity and temperature changes. The area of the instrument store at the South Bank hall is approximately 500 sq. ft. In addition there should be an inner store kept at the same temperature as the auditorium and large enough to take two grand pianos and the harps. The store should be designed to hold two sets of the following instruments: six timpani, one bells, one bass drum, one gong, one set of percussion, one vibrophone, 12 double bass, 15 celli, five trombones, 12 horns, two harps and six hampers of smaller instruments. Note the old Queens Hall arrangement by which a shelf 5 ft. deep took double basses on edge on the slant, and the kettle drums, under the shelf; hence good protection for double basses which are not, like 'cellos, put back into their cases.

The Principals' Section ought to be self-contained and if possible not a thoroughfare. It should be at stage level and have immediate access to stage on audience's left. Good accommodation should be provided for conductor, for stage steward, for four male and four female soloists and for the leader of the orchestra. These rooms will also be used for rehearsing and practising, and for auditions and so should be acoustically satisfactory and soundproof. This is important. There should also be a green room or lounge of 200 ft. super suitable for conferences and interviews, and a stage manager's office.

An important unit is the **Music Library**, probably not less than 600 ft. super, with maximum shelving for scores, and repair table; with strong room for precious copies and music manuscripts; and perhaps in addition a stack room for gramophone recordings.

Dimensions of rooms are as follows: Stage Steward 50 ft. super; Conductor 300; Green Room 200; Soloists 300 each; Leader 200; Stage Manager 200; Librarian 600. The artists' rooms should each have wardrobe cupboard; W.C.; shower; full length mirror; clock; telephone; and upright grand piano.

In the **Band Section** the old squeezed planning should give way to much more space in order to avoid damage to large instruments. Recesses or small stores and a plentiful supply of wall benches would be useful in order that instruments could be easily put down during intervals. There should be a series of locker rooms with lockers for 120 instrumentalists: some of these for lady musicians. Since instruments will be stored here, and tuned here, these rooms should be thermostatically controlled to give the same temperature and humidity as the hall. Also it is most desirable to have three or four small practice rooms (about 100 ft. super each) which shall be soundproof, where the brass can freely practise during performances. This sub-dividing into units tends to supersede the old musicians' hall where everyone was conning their passages at the same time and a cheerful cacophony reigned. This section also needs lounge, lavatories, refreshment service, call boxes.

The size of the **Choral Section** must depend on the size of the choirs to be provided for. Where choral festivals and choral competitions are to be held this should be large—say 400. A minimum should be 250. There should be two large dressing rooms, one for men and one for women, together with separate lavatories. A large lobby or ample circulation is equally necessary here. The choir assembly place should adjoin the platform.

An urgent need in modern concert buildings is room for group rehearsals at all hours of the day. Therefore **two large Rehearsal Rooms** are most desirable, one for instrumentalists in which the size and arrangement of platform seating is imitated; and one for choral work. But these could often make use of smaller halls seating 500 or so, provided in the building for public performance, for chamber music, for recording, for public lectures. A reason among others for this kind of rehearsal accommodation is to be found in the fact that if the main auditorium is very large its acoustic condition when empty makes rehearsing difficult. There is a great lack of good rehearsal rooms in London.

A piece of electrical equipment can help musicians, namely, a switch for turning on the *tuning note*—the A at frequency 440. This should be laid to all musicians' rooms. Moreover it has been suggested by Mr. Edwin Williams that since it is difficult to keep a violin in tune while a player is making the platform, when the call bell is out of pitch, it should be arranged that the call bell itself should sound the tuning A all over the building.

Lockers should be at 2 ft. centres and hold clothes and instruments. There should be a range of dressing benches, mirrors and lights, a centre table with benches. The rooms should have a noiseless floor and be treated acoustically. There should be a dressers' room and store. All sections must have cleaners' closets.

The House Manager's activities form a separate section. He and his house stewards and cleaning staff have to look after the whole building. A large locker room is wanted for the house stewards (two on each door); for the refreshment room and kitchen staffs; for the entrance hall and booking hall commissionaires. The House Manager will need a reception room and good office accommodation for himself and his Assistant Manager and Chief Steward. The Chief Steward has charge of the programmes, souvenir publications, etc., and must store them. He also deals with lost property—a nightly harvest of things belonging to ladies. For all this he needs some 200 ft. super. Then there is the First Aid and Rest Room: the Stationery Store and Archives; and ample service room for

cleaners. There is likely to be a resident Caretaker or Housekeeper needing a three-bedroom flat, and he would be included in this section. It is desirable to plan this section away from the back stage sections and self-contained. It should be accessible from the main staircase and the cleaners should be able to disperse readily to all parts of the auditorium. For the management sections the following sizes of rooms are given in the L.C.C. draft of desiderata. House Manager 200 ft. super, with Reception room 300; Assistant House Manager 200; Manager's Secretary with two desks 300; Chief Steward 200; in Locker Room the lockers at 2 ft. centres.

The **Administrative Section** should find itself on the front of the house on an upper floor near main staircase, but off the public circulation. It should provide normal office accommodation for the Director and his secretary with their secretariat, for the Concert Director, for the Publicity Manager. The latter will need a store cupboard and wall space for display. Also the Comptroller's office is an important unit needing space for the officer himself, his secretary, three accountants with their adding machines, filing cabinets, shelves, a built-in cash safe and ledger safe. If the concert hall is an important centre, a board room and committee rooms—suitable also for receptions—should be added. Sizes for the Administrative Section as to principals and secretaries repeat the general sizes of the House Management.

Broadcasting Requirements. The broadcasting of concerts, and use of the main hall for recording, makes necessary a B.B.C. Control Room (about 200 ft. super) and probably a Television Control Room (about 300). These must adjoin the hall and each have its soundproof observation window. For the B.B.C. it is also desirable to have a commentator's booth in an advantageous position. The wiring for electric equipment in these rooms makes it necessary to plan them next to, or as near as possible to, the main lighting and amplifier room. This room should have dimensions at least 200 ft. and is well served by the addition of a control booth of its own in the hall connecting with it. From this control booth the lighting and dimming of the auditorium can be well directed. The B.B.C. rooms need acoustic treatment in order to provide fair hearing conditions. In the matter of televising, very much stronger lighting and therefore supplementary lanterns with their controls will probably be required.

In order that microphones can be suspended neatly in a large number of positions a net of small holes should be left in the ceiling in the forward and centre part of the house at 6 ft. intervals. A further B.B.C. requirement concerns the platform. The resonant portion of the platform staging if it should extend under the percussion instruments, tends to give a boom easily picked up by the microphone: a solid block floor should therefore be provided under the percussion, insulated from the resonant portion.

Mr. H. P. Parkin: Mr. Bagenal has asked me whether I would like to speak for a few minutes about the contribution of scientists. The science of acoustics is developing rapidly, but it will be a good many years before the scientist can fulfil completely his function of translating the requirements of musicians into design criteria for architects.

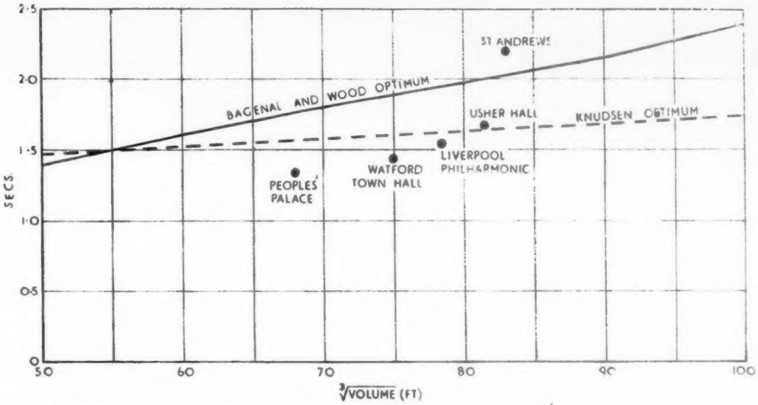


Fig. 10: Diagram referred to by Mr. H. P. Parkin

My first point concerns sound insulation. We can measure the noise levels, and we know the permissible noise levels in a hall. It is obviously bad to hear the noise of traffic in a concert hall, and in the old Queen's Hall the traffic was quite audible at the rear. There is also the intermediate case where, although the noise may not be recognizable as traffic, it produces a sort of rumble in the hall which has a bad effect on the music.

The second measurable quantity is reverberation time. Although we do not know exactly what it should be, there is a definite range outside which it should not fall. Fig. 10 shows as a full line the optimum line of Bagenal and Wood, while the dotted line is the Knudsen line from America. The English line gives a little longer optimum time than the American. This English line, however, is based on calculated reverberation times, which we now know can not be calculated very accurately, and it includes European halls with long reverberation times, which were particularly suitable for choral music. The difference between the two lines can therefore be due either to a difference between calculated and measured reverberation times or to a genuine difference between English and American musical taste. Also shown are the reverberation times of five halls as measured by the Building Research Station.

The modern trend in European halls is to have the reverberation time as long as possible, and therefore to use as little absorbent as possible, at least for the middle and high frequencies; but in modern buildings, which are often very solidly constructed and without windows, it is essential to introduce low frequency absorption, as Mr. Bagenal has mentioned. In the L.C.C. South Bank hall, the low frequency absorption is by wood panels, and can be altered by filling in the air spaces behind them. At these low frequencies it is not possible to calculate the reverberation time at all accurately, and therefore when the L.C.C. hall is finished, and before it is opened, we shall measure the reverberation time, and if any adjustment is necessary it can be made by altering the air spaces behind these panels.

The third measurable quantity is the absorption coefficient of the absorbent materials. There is now a wide range of absorbents available, and a very elegant example to be used in the L.C.C. hall is the so-called Copenhagen absorbent. This is really only a device to cover up a conventional absorbent such as glass wool or rock wool.

A negative contribution which we can make is the elimination of faults if any occur when the hall is built. One example is the elimination of echoes by tracing them to their source and treating the areas involved as necessary. Another example would be the elimination of standing waves which have a very long reverberation time at one frequency, which may occur in solid buildings, by using Helmholtz resonators, which can be adjusted to absorb at one frequency only. In the L.C.C. hall we have left about 3,000 small holes in the ceiling so that some resonators can be introduced if necessary.

Mr. Bagenal was worried about organs, which I once heard referred to as expensive draughts. I personally would say that in a few years' time the electronic organ will have been so improved as to be indistinguishable from the pipe organ. In 1948 a cantata by Benjamin Britten—'Rejoice in the Lamb'—was successfully performed in Ipswich using an electronic organ with console on the right of the conductor. When eventually they are developed so far that it is not possible to say which is an electronic and which is a pipe organ, Mr. Bagenal's worries on that score will be over; the placing of an electronic organ in a concert hall is no problem, and its cost is a fraction of that of a pipe organ.

Mr. W. A. Allen: Mr. Bagenal mentioned the three characteristic platform arrangements, and has asked me to comment on one particular type, that of the steeply raked platform. Conductors, as he says,

may differ profoundly in their opinion about orchestra arrangements, but there seems to be no question but that the steeply raked platform is, at least acoustically, the best. That is to be expected, because all the instruments are equally exposed, and experience in the Queen's Hall and in the Colston Hall certainly confirms it. Professor Bolt, of the Massachusetts Institute of Technology, told us this autumn that American opinion was now abandoning the flat platform to which it had adhered for some time, and is moving towards the raked arrangement; and, as Mr. Bagenal has said, Sir Malcolm Sargent has recommended it for the new L.C.C. hall.

Problems arise, however, in applying the principle. They are easy if the audience seating is well raked from the first row, as in the L.C.C. hall, because there is then no need to raise the front of the orchestra in order to get the sound out over the first few seats; it can instead begin virtually at floor level. I should like to show you the latest drawings of the platform arrangements for the L.C.C. hall (Fig. 11). You can see in the cross-section at the top that the rake begins only 1 ft. or so above the floor, and goes back in regular steps. Incidentally, the very black part of the cross-section is solid construction on concrete, and the grey part is the suspended construction.

The maximum rake for an orchestra is probably about 18 in. per step; otherwise it is difficult for the players to get to and from their places. If, however, a big orchestra and choir are to be accommodated in a hall, the maximum rake would represent a rise from front to back of 20 to 25 ft., which is very large indeed in a hall and is probably inconveniently high for the conductor, who does not wish to range over a big vertical dimension as well as a necessarily wide lateral sweep. In the new L.C.C. hall the total rise is about 12 ft. If an organ is to be accommodated behind the orchestra, this will also tend to limit the steepness of the rake, as again is exemplified in the L.C.C. hall. Here the average step is 1 ft. or thereabouts, and the front part of the platform is slightly flattened, because of the necessity to take two violin players together in one bench. If the orchestra and choir platforms were in fact put up to their maximum rake, plus a large organ opening, the front part of the hall would be excessively high, and there would be all sorts of troubles from echoes.

The size from front to back and from side to side also presents a problem, and both dimensions have to be restricted as far as is reasonably possible; otherwise the path differences for sounds from the nearest and furthest instruments make it impossible for them to be heard simultaneously by listeners. Added to this, there is apparently a tendency for the percussion instruments to lag slightly. These are usually the most distant instruments, and any delay on their part would, of course, accentuate the path differences. Everything that can be done, therefore, reasonably to compress the dimensions of the orchestra will add to the clarity of its sounds. In particular, of course, the depth from front to back should be limited, because for most of the audience this is the only dimension that matters. In the L.C.C. hall plan the depth of the orchestra from front to back is about 30 ft.

Pianos want particular attention. They should obviously be in a low position, so that they do not screen the instruments behind them, usually the weaker ones such as the woodwind and violas. It is also important to be able to move them out on one level. Conductors often want to get rid of them for part of the programme, and the question arises of whether they can be shifted by two men, or whether six are required. That tends to affect the economics of the operation of the concert, quite apart from the sheer mechanical difficulties involved. In the L.C.C. platform the recess at the front is at the main floor level, and that recess serves as a piano bay, suitable for any number from one to four.

Mr. Bagenal also invited me to make a few comments on the lighting of halls, but it seems to me that he has covered the subject exceedingly well himself. He has set out a framework of ideas which will be novel to illuminating engineers, and for this reason it seems certain that architects will have to be on their guard if they want to get them applied. They should be applied, of course.

The provision of good light for the orchestra, which Mr. Bagenal mentions, is a vital matter, but he did not, I think, emphasize just why this is so. People respond more quickly as the intensity of light on their work increases. That is a fact, and the effect has been measured; and, since quick reading is essential in music, even when the score is well known, the better the light the better the playing will be.

Mr. Bagenal fears the risk of overlighting. I think that he really means the risk of glare, which in badly-designed lighting systems often tends to increase as the illumination level increases. It is true that some forms of glare are stimulating, and stimulation is an excellent thing for players, even if it makes them feel more tired later; but excessive glare is a danger, and will interfere with the players seeing the conductor, and will fatigue them. Our finding at the Building Research Station is that the sources of light should be well distributed over the orchestra area and should have a high angle of cut-off, 60 deg. or more, and the surfaces round the lights should be bright enough to keep contrasts within reasonable limits.

Mr. Bagenal's description of the desirable lighting for the seating area is challenging. I believe that he is quite right; contemplation is probably the most desirable listening condition with bright, stimulating, sparkling lighting for the intervals. We need the modern equivalent of the chandelier, at least for the interval. Goodness knows what we need for contemplation; no scientist could define it yet, especially when it has to light also the audience's scores. So far as can be judged at present, I think that it might be obtained by some very glare-free fittings in the ceiling pointing downward and throwing a little, but very little, light on the ceiling to spill back some on the walls. We need a little light on the walls and a little light on the ceiling, and rather more light directly downward.

DISCUSSION

Dr. Alexander Wood: It is not for me to deal with the technicalities of the subject, much as I might like to do so, because Mr. Bagenal never lectures without trailing his coat, and some of the points he has raised I should love to carry further.

My function this evening is to express our thanks to him. I do so with especial pleasure because of the interesting personal association which I have had with him now over a very long period of years. About thirty-five years ago, at the time of the first world war, I was acting as Commandant of a Red Cross hospital, and, as a physicist, I had just come to be interested in the work of Sabine on architectural acoustics. Into that hospital came as a patient a wounded R.A.M.C. sergeant, and I found that he was at work on this same subject, preparing his thesis for this Institute. I as a physicist and he as an architect found this mutual interest, and that not only formed what I hope was a useful association but a friendship which I have valued profoundly.

Mr. Bagenal, while he has his head in the air, also keeps his feet very firmly on the ground. There was a combination in the lecture of the practical and the theoretical which I for one greatly appreciated. It is always interesting to see the reactions of the artist when he comes in contact with the scientist and technologist. Some artists recoil in horror from the encounter; others—and I speak here as a scientist of sorts—keep science in its proper place as the servant of the artist, not dictating to the artist but useful as the servant of his art. One of the things which I have appreciated in my friendship with Mr. Bagenal is that not only does he disbelieve in science and technology for its own sake, and wants to use it as the servant of his art, but he does not even believe in his art for its own sake, and art with him is always the servant of something greater, the servant of the good life.

Mr. Basil Cameron: I am very glad to have this opportunity of offering my humble tribute, as a practising musician, to the superlative value of the services rendered to music by Mr. Bagenal. We all know that years ago the question of whether a concert hall would be good for sound when it was built was largely a matter of chance; but even today I do not think that it is generally recognized that the first essential for successful music-making is to be given a concert hall where the listener in any part of the hall can be sure of hearing an undistorted performance.

Towards that ideal state of affairs I personally have been fortunate in being guided by Mr. Bagenal on two occasions. I first met him in 1927, when the White

Rock Pavilion was being built at Hastings, and where Mr. Bagenal's expert advice was the deciding factor in the ultimate success of that hall.

Our next meeting was in 1941. In May of that year, Queen's Hall was destroyed. Mr. Keith Douglas, who had taken over the financial responsibility of the Henry Wood Promenade Concerts in 1940, decided to transfer the 'Proms,' after the destruction of Queen's Hall, to the Royal Albert Hall. I told Mr. Douglas that he would have to do something about the famous echo of the Albert Hall. I also told him that the only St. George I knew who could destroy this dragon of an echo was Mr. Hope Bagenal.

His recommendations regarding the acoustics of the Royal Albert Hall have been published by the Royal Institute, but in 1941 we were hampered by all kinds of difficulties, as well as by war-time restrictions on the purchase of materials and the use of labour. However, the main point is that on the opening night of the 1941 Proms it was generally agreed that the dragon echo was absent.

My experience of Mr. Bagenal's very great gifts adds to my pleasure in seconding this vote of thanks.

Mr. Bertram Lewis: I speak as orchestral manager of the London Symphony Orchestra. During the war we toured a great deal, and it was always my job to seat the orchestra in each hall we visited. It is almost unbelievable how difficult it is in nearly every hall in England to seat an orchestra in such a way that everybody is comfortable. I hope very much that architects, when they are considering the design of platforms, will give careful consideration to this point, so that the members of the orchestra can be really comfortably seated. In the Albert Hall it is very difficult, because the radius is far too great and the members of the orchestra at the sides have to sit at an uncomfortable angle to see the conductor. The amount of space in the risers is also important. We want a foot on each rise for comfort; the Albert Hall is far too narrow.

Mr. John Christie: I should like to see a publication giving the results, scientific and artistic, obtained in different buildings. I thought, when I heard a concert in the White Rock Pavilion in Hastings, that the orchestra sounded as if the music was coming out of a gramophone horn. At Covent Garden, if you sit in the stalls, stalls circle or first circle you simply do not hear the violins, and when you listen to Wagner there all that you hear is the wind and the 'cellos. Another point, and one which has not been mentioned tonight, is that the acoustics must be more or less the same when the hall is empty for rehearsals and when it is full.

The brass, when you place the orchestra on the platform, is always much too loud. The Vienna brass achieves its extraordinary result by going underneath, under the surface, with the strings sweeping backwards and forwards over it, but I do not hear that with the English orchestras placed on a platform.

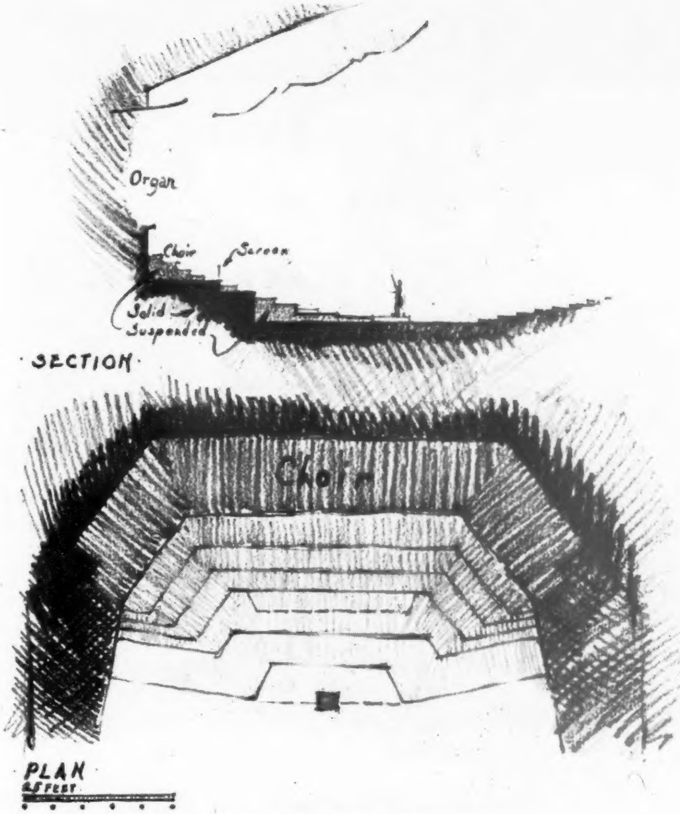


Fig. 11: Diagram referred to by Mr. W. A. Allen

Mr. Basil Cameron: I should like to ask Mr. John Christie whether he heard the concert to which he refers at the White Rock Pavilion when the pavilion was in its original state or since the proscenium has been added. At the time it was opened it sounded better, but in 1930 or 1932 a proscenium was added so that stage plays could be put on.

Mr. John Christie: I think that it was in 1936 or 1938. I am not satisfied with it as it is now.

Mr. Basil Cameron: Neither am I, now.

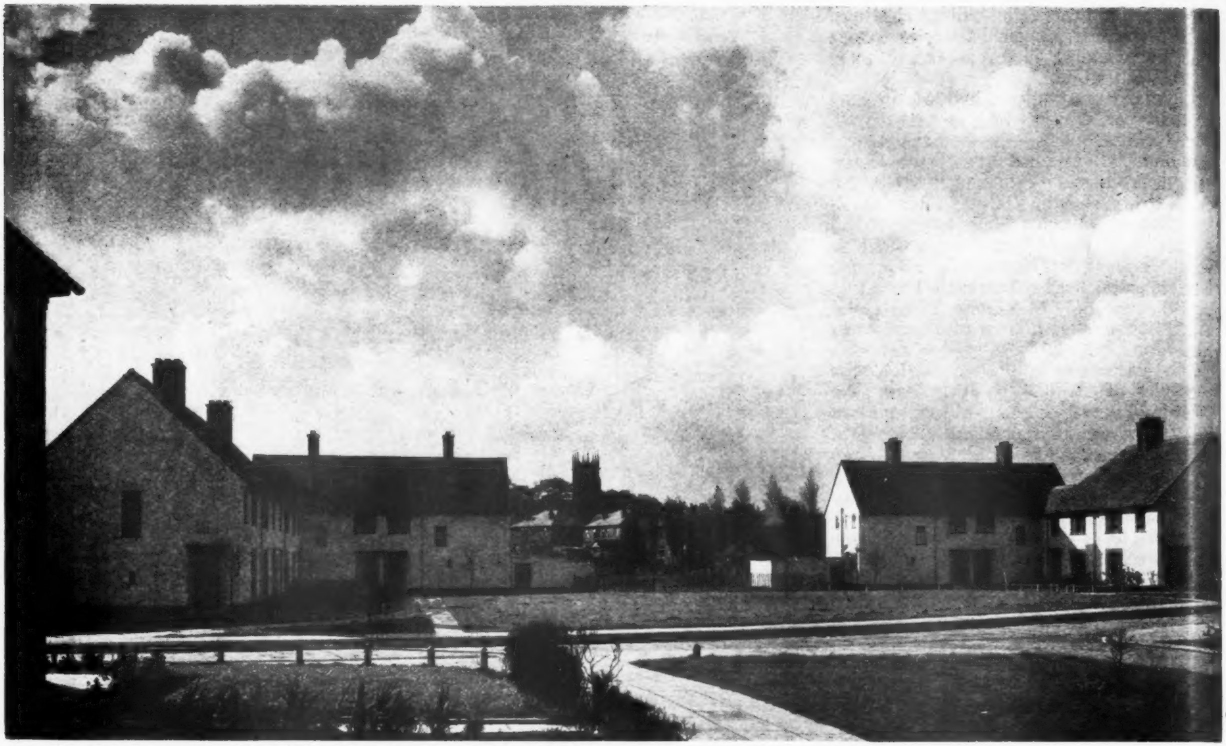
Mr. Hope Bagenal, in reply, said: I want to thank you very much indeed, and on behalf of Mr. Allen and Mr. Parkin as well as myself, for listening to what was rather a long lecture.

I agree with Mr. Bertram Lewis that it is very important indeed to remember his point of radial planning for the platform seats, if you can afford it and if it can be managed. It is also very important to try to get the risers the right height. I have often wondered why it was that musicians objected to the high riser. I think that it is partly due to the fact that if you are lugging a big double bass up and down and you fall there is trouble.

I also heartily agree with Mr. Christie on the question of trying to get the conditions in a big hall at rehearsals as nearly as possible the same as those which will be found when the hall is full. We can not get *exactly* the same conditions; that is impossible in practice if we want concert hall conditions and not theatre conditions. With a theatre, with big upholstered seats and a carpet, it can be done, but if you have a fairly big cube per seat and not very much absorption you are liable to get this trouble during rehearsals. An attempt is being made to overcome that, however, by having a curtain at the back which will be drawn under the gallery in the new South Bank Hall, and that is the way to tackle it.

On the question of the brass I entirely agree with Mr. Christie. I asked a famous conductor the other day whether it was necessary for us to be deafened by the brass; he said that it was not necessary at all, that it was quite possible to play not so loudly on the brass, and that that was really the solution. One would like to put the brass, as Wagner did, right at the bottom of the orchestra pit with a great hood over them, but that is not necessary if they will play not so loud.

I want to end with a plea for better conditions for players behind the scenes, and to tell you the story of a very elderly musician who on his ninetieth birthday said he had seen the introduction of the railway and of the bicycle and motor car, of the telephone and of television, and that he was looking forward to the time when he would see hot water in the wash basins at the Albert Hall.



View from within an estate. City of Liverpool. Architect: Sir Lancelot Keay, K.B.E. Photo: Crown copyright

The Housing Manual Reviewed

By Paul V. E. Mauger, M.T.P.I., Dip.T.P.(Lond.) [*F*]

THE NEW HOUSING MANUAL is so great an advance on its 1944 predecessor that its prosaic title is apt to sound strange to those who appreciate it for its author's skill as designer, co-ordinator and exponent of so complex a subject within the compass of a book of 150 pages. Its scope is limited by the omission of technical matter, contained in the 1944 Manual and its appendix; this will be dealt with in a companion volume to be published by the Ministry of Works, and thus helps Mr. Forshaw and his colleagues to give us a readable essay which flows from the first chapter on Housing and Site Planning to the concluding notes on new methods of construction.

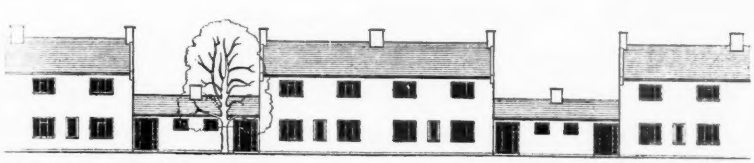
Those who have been frustrated for four years by the indexing and complicated arrangement of the original Manual, will be glad to find that there are now a table of contents and index which are models of clarity and that the two appendices give all the necessary information on street widths and space standards in dwellings. It will be noticed that road widths suggested are reasonably economical—as compared with those sometimes required by highway authorities—and that room sizes remain much as they were, but that owing to the provision of a second w.c. in all but the smallest houses the total floor space is rather larger.

The concise and simple text tends to make us forget that it brings formal confirmation of great changes in public housing policy which have emerged during the past five years. Examples of this are the new emphasis on the provision of suitable homes for 'families' of all sizes and of varied income ranges whether the single person, old age pensioner or the large families of manual and professional callings alike; and the consequent possibility of catering for various types of accommodation in the same schemes—thus creating both balanced social communities and more lively groupings of buildings. Another trend encouraged is a return to the urban dignity of the three-storey terrace house. Ideas like these are not, of course, new to architects concerned with housing who have been advocating them for years, but it is encouraging that the Ministry has lately given its support to such projects, so that there are now examples of them which can be illustrated and commended in the Manual.

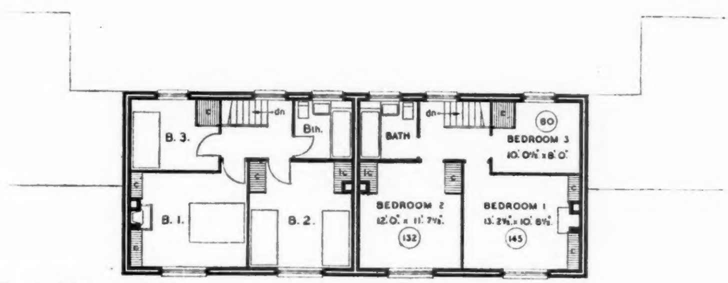
The line drawings of housing types are in interesting contrast with the views of completed schemes—the former being pleasantly drawn to show the essence of the design and as such nearly always convincing and sometimes, as in Mr. Forshaw's three-storey terraces, outstanding solutions: the photographs on the other hand show how local conditions have had their say in the finished result; some on well-chosen sites and with good gardens look like the outcome of collaborators fortunately matched and blessed with an open mind, for only the architect knows how much a good client can do for architecture. In other schemes one senses a reluctance to welcome the new trends encouraged in the Manual and the ubiquitous semi-detached three-bedroom house suggests that only the family of four or five is being catered for and that old couples, unmarried school teachers, confirmed bachelors and Mr. and Mrs. Traddles and their great family are misfits to the council's scheme of things—a reflection not, of course, invariably fair on the council.

To satisfy the eye of the passer-by is not, however, always to please the tenant whose neighbour, perhaps, has a dog and two small boys and whose front gardens are not fenced or hedged. It is, indeed, difficult to find a solution to the open green problem and as it may add so much to the charm of the whole setting it seems worth while to try to find a solution. Mr. Forshaw's preference, as shown by his model of a new residential estate, is all for open fronts but as he knows the snags—and perhaps felt that a full treatment would be impossible within the small compass of the Manual, he remarks (para. 66) that 'where some form

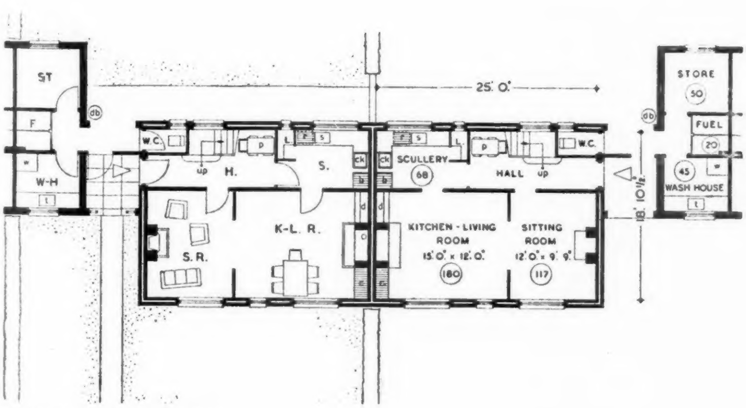
Above: A colony with recreation and meal room as a central feature. Sturminster R.D.C. Dorset. Architect: Geoffrey Clark [*L*]. Right: Flats for Lambeth B.C., London. Architects: Booth and Ledeboer [*AA*]. Photo: Crown copyright



ELEVATION TO THE ROAD



FIRST FLOOR PLAN



GROUND FLOOR PLAN

A rural semi-detached house, south aspect. Five persons, floor area 944 sq. ft.; outbuildings. 132 sq ft. A house with one entrance. Double or sliding doors between kitchen-living room and sitting room. An extra door could be provided from hall to kitchen-living room

of fence in front of the house is required it should be . . . low . . . backed with flowering shrubs'. One could have wished that something might have been said on the usefulness of encouraging tenant committees who might be asked whether they could not find a better use on their estate for the sum reserved provisionally for front hedges and fences—such as some effective counter-irritant in some secluded spot, where the small boys could be as ingenious or as destructive as they wish. Experience seems to show that greens are not likely to succeed unless the tenants really come to like them enough to make common cause with the council by vigilance in their protection.

An important section, which it is to be hoped will be studied by housing committees, is Chapter 5, on which the Ministry of Fuel and Power was consulted. Its theme is that 'no building is well designed if it is difficult or too costly to heat satisfactorily', and it recommends that 'the main appliance should combine water heating with space heating or cooking or both' and that provision for continuous burning should be possible so as to cater for background heating adequately. Further guidance will be given in the technical section, but enough is said in the Manual to show housing authorities that domestic comfort is now a possibility consistent with national fuel economy and reasonable first cost.

This instance of housing policy being geared as never before to the results of research and of inter-departmental co-operation is typical of the whole tone of the Manual, for the Ministries of Town and Country Planning and Transport have also been consulted on their concerns which impinge upon housing.

Gone too is the self-defeating search for cheapness at all cost. A truer sense of values is now encouraged and is made up of long-term considerations such as maintenance cost and, more importantly, the tenant's comfort of body and spirit, the pleasure of the passer-by, the integrity of the landscape and the relation of the house to the neighbourhood. The appearance of this imaginative Housing Manual thus gives the occasion for recognizing the Minister's fine vision and his colleagues' sterling work towards its fulfilment.

R.I.B.A. Prizes and Studentships 1950

List of Awards

AT A GENERAL MEETING on 3 January the Council's Deed of Award giving the results of the competitions for the Annual Prizes and Studentships awarded by the R.I.B.A. was read. The awards are :—

The Tite Prize: A Certificate and £100 for the Study of Italian Architecture. The subject was 'An Industrial College Research Library' Awarded to Mr. James Daniel Shearer [Student, R.I.B.A.], 71 Great King Street, Edinburgh, 3. (School of Architecture, Edinburgh College of Art.)

The Soane Medallion and £120 for Architectural Study Abroad. The subject was 'A Parish Church'. Awarded to Mr. Colin Laird [*A*], 59 West Kensington Mansions, W.14. (School of Architecture, The Polytechnic, Regent Street, London.)

The Pugin Studentship: A Silver Medal and £80 for the Study of Mediæval Architecture of Great Britain and Ireland. Awarded to Mr. Derek Anthony Cobb [Student, R.I.B.A.], 'Grassendale', 29 Birch Avenue, Wilmslow, Cheshire. (School of Architecture, The University of Manchester.)

The Owen Jones Studentship: A Certificate and £80. For the improvement and cultivation of knowledge of the successful application of colour as a means of architectural expression. Awarded to Mr. John Newel Lewis [*A*], c/o D. J. Lewis, 16 Hill House Road, London, S.W.16. (School of Architecture, The Polytechnic, Regent Street, London.)

The Grissell Gold Medal and £35 for the Encouragement of the Study of Construction. The subject was 'A Sports Club House'. Awarded to Mr. Kenneth William Charles Reed [*A*], 92 Tanfield Avenue, Gladstone Park, London, N.W.2. (School of Architecture, The Polytechnic, Regent Street, London.)

The Andrew N. Prentice Bequest: A Certificate and £150 for the Study of Spanish Architecture. Awarded to Miss Rachel Alice Caro, Dip.Arch. (Lond.), A.M.T.P.I. [*A*], 15 Woodfall Street, Smith Street, Chelsea, S.W.3. (Bartlett School of Architecture, University College, London.)

The Royal Institute Silver Medal and £50 for an Essay. Not awarded.

The Banister Fletcher Silver Medal and £26 5s. for the Study of History of Architecture. The subject was 'The Smaller English 18th-century Country House: Its Setting and Furnishing'. Awarded to Mr. John Leigh Corfield [Student, R.I.B.A.], 'Woden', 100 Eaton Grove, Swansea.

The Alfred Bossom Research Fellowship and £250 for Post Graduate Research. Awarded to Mr. Leonard William Elliott, A.M.I.C.E. A.M.I.Struct.E. [*A*], 6 Masons Yard, Duke Street, London, S.W.1.

The Godwin and Wimperis Bursary: A Silver Medal and £245 for the Study of Works of Modern Architecture Abroad. Awarded to Mr. Emil C. Scherrer, M.A. [*F*], 18 Harcourt House, 19 Cavendish Square, London, W.1. (School of Architecture, University of Manchester.)

The Henry Saxon Snell Prize and Theakston Bequest: £125. (Offered jointly by the R.I.B.A. and the Architectural Association for the study of the improved design and construction of hospitals, convalescent homes and asylums for the aged and infirm poor.) Awarded to Mr. Sidney Edward Thomas Cusdin, O.B.E., A.A. Dip. [*A*], 54 Bedford Square, London, W.C.1. (Architectural Association, School of Architecture.) A Certificate of Honourable Mention was awarded to Mr. Kenneth Halstead Evans, Dip.Arch. (Dist.) (Liverpool) [*A*], 27 Druidsville Road, Calderstones, Liverpool, 18. (Liverpool School of Architecture, University of Liverpool.)

The Hunt Bursary: £75 for the Encouragement of the Study of Housing and Town Planning. Awarded to Mr. Leslie Vivian Mitchell, Dip.Arch., A.M.T.P.I. [*A*], Dept. of Town and Country Planning, P.O. Box 56, Causeway, Salisbury, S. Rhodesia. (School of Architecture, The Polytechnic, Regent Street, London.)

The Athens Bursary: £125 for Study at the British School at Athens. Awarded to Mr. Frank Fielden [*A*], School of Architecture, King's College, Newcastle-upon-Tyne, 1. (School of Architecture, King's College, Newcastle-upon-Tyne.)

The Henry L. Florence Bursary: A Certificate and £350 for the Study of Greek, Hellenistic and Byzantine Architecture of the Mediterranean Basin. Awarded to Mr. George Uvedale Spencer Corbett [*A*], 'Fairwinds', Kingswear, Devon. (Architectural Association School.)

The Arthur Cates Prize: £80. (In the current year the Prize was offered for 'A Study of the Cantilever Principle in Architectural Design'.) Awarded to Mr. Victor Charles Launder [*A*], 'High Beeches', Castle Hill, Carisbrooke, Isle of Wight. (School of Architecture, Southern College of Art, Portsmouth.)

The Rome Scholarship in Architecture, 1949: £250 per annum for two or three years' study and research at the British School at Rome. Offered by the R.I.B.A. and awarded by the Faculty of Architecture of the British School at Rome. Awarded to Mr. Ian Scott Melville [*A*], 4 Blackburne Terrace, Blackburne Place, Liverpool, 8. (Liverpool School of Architecture, University of Liverpool.)

The R.I.B.A. Silver Medal and £10 in Books for Students of Schools of Architecture Recognized for Exemption from the Final Examination, 1949. Awarded to Mr. Philip Russell Diplock, B.Arch. [Student R.I.B.A.), 60 Croxteth Road, Liverpool, 8. (Liverpool School of Architecture, University of Liverpool.)

The R.I.B.A. Bronze Medal and £10 in Books for Students of Schools of Architecture Recognized for Exemption from the Intermediate Examination, 1949. Awarded to Mr. Frank Sykes [Student, R.I.B.A.], 13 Heathfield Grove, Hollingwood Lane, Lidget Green, Bradford. (Leeds School of Architecture.)

The Archibald Dawnay Scholarships, 1949: Five Scholarships of the Value of £60 each for the Advanced Study of Construction. Scholarships awarded to Mr. James Michael Pollard [Student, R.I.B.A.], 17 Hart Close, Rugby (Leicester College of Art); Mr. Edward Jones Williams [Student, R.I.B.A.], Tan-y-Graig, Criccieth, N. Wales (Welsh School of Architecture); Mr. William Alexander Greig [Student, R.I.B.A.], Westfield Cottage, New Deer, Aberdeenshire (Robert Gordon's Technical College, Grays School of Art, Aberdeen); Mr. Alexander Henry Bannerman [Student, R.I.B.A.], 96 Clifton Road, Aberdeen (Robert Gordon's Technical College, Grays School of Art, Aberdeen); Mr. John Smith Bonnington [Student, R.I.B.A.], 25 Briermede Avenue, Gateshead-on-Tyne, 9 (School of Architecture, King's College, Newcastle-upon-Tyne).

The R.I.B.A. Henry Jarvis Studentship at the School of Architecture, The Architectural Association, 1949: £50. Awarded to Mr. William John Gilbert Godwin [Student, R.I.B.A.], Oaken Cottage, 53 Marlpit Lane, Coulsdon, Surrey.

The R.I.B.A. Howard Colls Travelling Studentship at the Architectural Association, 1949: £15 15s. Awarded to Mr. Robert Alfred Maguire [Probationer, R.I.B.A.], 71 Third Avenue, Queen's Park, W.10.

The R.I.B.A. Donaldson Medal at the Bartlett School of Architecture, University of London, 1949: Awarded to Mr. Edward Martin Glossop Wells, A.R.I.B.A., 32 Gunter Grove, Chelsea, London, S.W.10.

The R.I.B.A. (Anderson and Webb) Scholarship at the School of Architecture, Cambridge University, 1949: £55. Awarded to Mr. E. H. Cullinan, Cambridge University School of Architecture.

The R.I.B.A. Prize for Art Schools and Technical Institutions with Facilities for the Instruction of Intending Architects (£10 in Books).

The R.I.B.A. Prizes for Public and Secondary Schools. These prizes are of a total value of £10 10*s*. They are offered for an Essay of not more than 1,000 words or for sketches or scale drawings of a building or part of a building. The prizes were awarded as follows: **Essays.** No entries. **Sketches:** A prize of £5 5*s*. to Brian Williams, The Grammar School, Manchester, for his drawings of the Parish Church of St. Leonard, Middleton.

Heating Research and House Design

By Richard Eve, B.Arch. [*A*]

Read at a meeting of the R.I.B.A. Architectural Science Board 13 December 1949

Arthur W. Kenyon, C.B.E., M.T.P.I. [*F*], in the Chair

THIS PAPER will be a disappointment to those who know that its author has completed three years' study of house heating as a member of the team of workers at the Building Research Station. With this background they may expect ideas that will revolutionize our techniques. Such notions arise inevitably when minds are turned to any problem, and they are not lacking in the field of heating, but less spectacular aspects have engaged the attention of research work at the Station. There the effort has been directed towards supplying the norm that has been lacking by which we may judge proposals new and old, existing or conceptual. In this work the scientist is not in the role of explorer pushing forward into the Darkest Unknown; he is rather the surveyor who measures carefully the topography of explored territory and maps for us the detail.

In heating this basic work is particularly essential; advocates of one method or another have claimed that theirs is the vantage point, but numerical assessment has been lacking. Just as the surveyor's finished work allows us to compare with reasonable accuracy the terrain he has mapped, to draw our own conclusions and to make our own decisions as to where we shall site our buildings, so the scientist sets before us the results of his investigations, in such form that he does not bind us with detailed instructions, but rather directs us away from the unsuitable land and then describes the advantages and disadvantages of the good ground. In doing this he frees us from the bogeys found in the tall tales that less exact reporters have spread about the neighbourhood. It was the famous Sir Henry Wootton, I think, who, in suggesting factors that should be taken into account when siting a house, advised avoiding territories where 'prodigious births abound'. Some of the crankier proposals of the heating fraternity are no more helpful when we try to settle our warming problems.

The surveyor is luckier than the scientist, for architects are all taught to read the surveyor's system of notation, but of the scientist's we have at best but a smattering of ignorance. We talk roughly the same jargon as the surveyor, but a scientist's is to most of us an almost foreign language. His jargon he can, of course, translate, but we are still confounded by his special form of pleading. We forget, however, the problems of his trade. In reporting his work, the scientist's first objective is to convince his audience of his impartiality. Long experience has shown him the need—particularly when he is working in the realm of applied science, which forms so much of the scientific requirements of the building industry. If there is to be confidence in the scientist's statements, it is essential that they show that all comers have been tested on an equal basis and that the reasons for failure are as clearly set out as those for success. For the sponsors of an object that has failed in a test often wish to carry the argument to its utmost limits in order to be certain that the project upon which they have lavished so much care should not be lightly abandoned.

Thus it was that when the first results from the heating trials of the Building Research Station were presented to the Architectural Science Board a year ago, the paper given then was confined mainly to a statement of the first year's findings. In the paper presented tonight my endeavour is to draw conclusions from these trials and to outline how, after studying the B.R.S. data, I suggest that houses of around 1,000 sq. ft. of floor area can be heated most suitably. The interpretation of the data suffers from the imposition of my personal views. My hope is that the demarcation between the data and my judgment is entirely clear. Not all the data are from the Building Research Station; some are drawn from other sources, but the conclusions are largely influenced by my experiences at the Station. However, the Station must not be saddled with the responsibility of answering on my behalf.

One difficulty confronts us. The human factor in heating has not yet been accurately assessed. However, in the present state of the world it is apparent that for most of the population the human factor revolves largely around the family finances; indeed all of us know only too well that the problem is essentially an economic one. In this country we rely upon coal for heating. By far the major part of the fuels that we use in our houses derives from this source. In the battle that has endured only too long between gas and electricity we have sometimes lost sight of this factor. Now, when the country has decided that these are best owned by the people themselves, the picture changes. These two great industries become but branches of a single one, which could be called Coal Conversion. Competition might now be restricted to the field of research and development; in the merchandising field a united policy of selling whichever appliances use coal at the highest efficiency for the task in hand would serve the consumers best.

It is not only a matter of running costs, however. The installation of appliances for heating the house, the hot water, and doing the cooking, including flues, ducts, vents, hot water cylinder and piping, etc., amounts to between 10 per cent to 15 per cent of the total costs of the building.[1] If, therefore, we are too lavish we will increase the rental of a property during the life of that building; on the other hand, some of the systems may condemn the householder to running expenses that he can ill afford. M'Gonigle, in his book *Poverty and the Public Health*, showed that more than a hundred families, moving from bad housing to good, lost in health because the family income could not encompass the higher rents and proper food. If we add to the burden of the tenant by the heating system, the environmental conditions will be out of balance with the nutritional standards for many people.

It is difficult to ascertain the income of this client who lives in a house of 1,000 sq. ft. and to find what proportion of it he spends on heating. As far as I can learn,[2] for inhabitants of houses of the three-bedroom type, of which we are speaking, and which can reasonably be occupied by between three and six persons, the family incomes for April 1947 ran somewhat as follows: nine out of every ten households received £10 a week (£520 a year) or less; six out of ten had £5 10*s*. or less; and two in ten had £4 a week or less. A total annual fuel bill of between £20 to £25 (7*s*. 6*d*. to 9*s*. 6*d*. a week) represents 10 per cent of the income of two out of every nine households that might inhabit such houses. For this it is very hard to buy enough heat to warm the house, even when insulated to the better post-war standards. The first year's operation of the houses at Abbots Langley showed that at representative London prices for April 1948 (a year later, please notice) for between £20 to £25 a year there were only five systems that did the work for this sum.[1, 3] Of these, two were reasonably economical to build—one system had an open fire with back boiler and the other a free-standing openable stove with back boiler—the cooking could be either by gas or electricity. Three others which showed annual fuel costs of this order were two central heating systems and a prefabricated heating unit, but the extra first costs of these are substantial.

That we are searching for heating systems in this order of annual fuel cost is further confirmed by an estimate of the national average, which is £27 a year per household;[3] recalling that this takes in houses of all types, the figure of between £20 to £25 seems a reasonable objective for a range to cover the inhabitants of 1,000 sq. ft. houses. Unfortunately, one out of every five of these will have to be at the lower end of the scale; so that the type of system is one that will cost around 7*s*. 6*d*. to 9*s*. 6*d*. a week to run. As 2*s*. 6*d*. out of this is the amount estimated to be required for cooking, it means that 5*s*. a week is available for space heating and hot water

Fig. 1: A view of Parkchester, America

at the lower end of the scale. To accomplish this it is probably necessary to have but the lower floor fully heated and to leave the heating of the bedrooms to the vagaries of the tramp heat for the lower incomes while allowing additional heating to be added for those who can afford it.

If whole-house heating were set as the objective a very high order of thermal efficiency would be necessary. The sort of building that results is seen in Fig. 1, which is a view of part of Parkchester, a real estate development by the Metropolitan Life Insurance Company in New York City.[4] Here 58 buildings house over 12,000 families and provide them with neighbourhood facilities such as shopping centres, a cinema and a garage for about 3,000 cars; in other words—a complete new town. About 11,000 of the dwellings are three- and four-room flats with living-rooms of 225 sq. ft. and bedrooms of between 130 and 190 sq. ft. The average cost of heating each dwelling in 1946 was 3*s*. 5*d*. a week, including the cost of heating all the neighbourhood facilities, and this in the city of which it is said 'a 50 cent meal costs 75 cents'. These are the most economically heated buildings I have encountered in my work, particularly as the mean temperature in all rooms is probably 70 degrees F., if not more, and the winter severer than our own.

This low cost of heating is achieved partly by blocking the dwellings into large buildings so that the amount of exposed surface through which heat can be lost is greatly reduced. It is often forgotten that a three-storied terrace house offers but half the exposed surface of a detached bungalow of the same size and about 70 per cent of that of a semi-detached house.

At Parkchester the surfaces that are exposed are extremely well insulated; the walls are 16¾ in. brick with a vapour barrier and backed with 1 in. glass wool insulation plastered. This gives a U value of about 0.10 BTU/per hr. per sq. ft./per deg. F. which is probably a higher degree of insulation than required in this country. The B.R.S. have been recommending insulation since 1934, and their trials have delineated the degree that is effective economically. Shortly they will be summing up these trials, taking into account the effect of occupancy. Pending this information our objective for houses of around 1,000 sq. ft. floor area should be U values of between 0.20 to 0.25 for exterior walls, and between 0.15 and 0.20 for ground floors and roofs.

In this view of Parkchester the single chimney stack tells us that this is a district heating scheme, and since it is in America it is not surprising that steam is the medium of distribution—incidentally in a piping system of very economical design.

It is apparent that thermal efficiency, carried to extremes, could involve a considerable alteration in our way of life, and one that is not entirely acceptable to the British; indeed it is not acceptable to all Americans. That we have already advanced some way down this road is fairly evident, for large blocks of flats are with us to stay. If one can judge from the published illustrations few of ours have had thermal efficiency as their objective. The forest of chimneys that is only too often apparent suggests that in heating other considerations weigh, the prime one being to retain the open fire.

So much pride and prejudice have already been lavished upon the open fire that perhaps I may expend a little more on my own account. My prejudice is in favour of the open fire—but purely as an æsthetic feature. What I like about an open fire is the visual effect. What I dislike about the open fire is the type of heating it gives. But the visual aspect is at its best when wood is being burnt and there are a cheerful noise and sparkle. Compared to this the coal fire seems a second best, and further, the smoke from the coal is unpleasant and extremely harmful to buildings. As to the gas or electric devices, they aren't open fires—they are well named high-temperature radiant heaters, in which most of the disadvantages of an open fire are re-

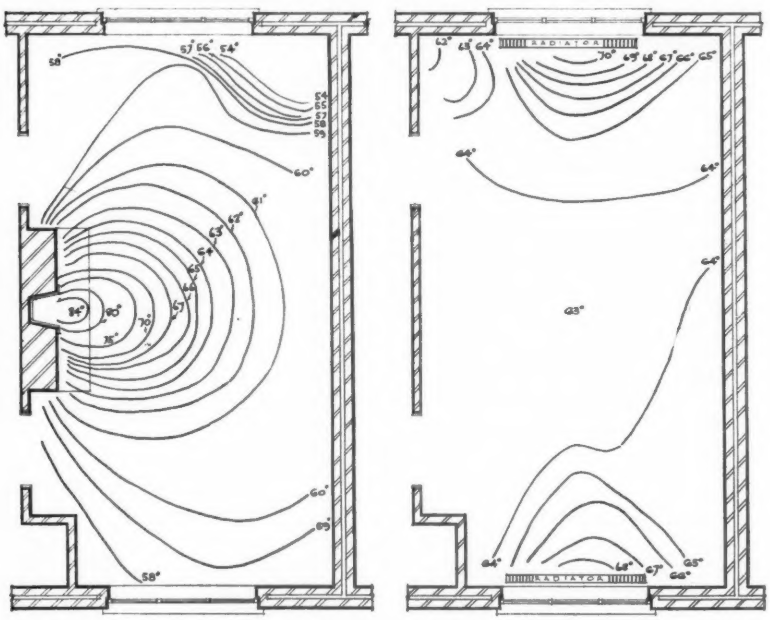


Fig. 2: Air temperature charts. Left, open fire; right, radiators

tained. There is further the matter of fire hazard connected with all and any types of open fire. Should anyone feel complacent in this matter I suggest that they ponder Colebrook's paper called *The Prevention of Burns and Scalds* in July 30 issue of THE LANCET.[5] This may remind all of us, architects and appliance designers for *all* fuel types, of the degree to which we are failing in our duty. For in houses where small children are likely to be inhabitants we have a duty to arrange matters so that fire-guards can be firmly fixed in place. Colebrook's figures indicate that those who suffer most from this neglect of ours are the children under four years old. As designers we can at least provide the methods for fixing screens easily and firmly.

It has been said that high-temperature radiant sources give a personal warmth. They do; they give a warmth over a limited area which a person can achieve by walking into that area. Fig. 2 shows the comparison between the air temperatures in two living-rooms at Abbots Langley—one heated by an open fire and one by radiators. With the unimproved open fire one is condemned in winter to activity within the fireside circle, but if the heat of this fire can be spread to other parts of the room or house, activities need no longer be curtailed; you can go and do fretwork in the dining-room or surrealist painting in the bedroom and in other ways prolong the activities of the day, should you so wish. However, so strong is the desire for an open fire that the technicians of this country have produced new appliances which make a reasonable compromise between the limits of the open fire and the efficiency of central heating. It is these that offer the next step in the evolution of efficient house heating. You know these appliances, the openable stove (Fig. 3), the closeable fire (Fig. 4), the improved open fire (Fig. 5), and installed in houses with improved weather protection the chances are greatly increased of obtaining equable temperatures over much of the house for reasonable expenditure.

However, the whole *modus operandi* of house heating becomes a reversal of our pre-war method when we probably hit an all-time low in extravagance and inefficiency in the matter. Whilst those who hadn't the price went cold, those who could afford it wasted much of the heat that was in the coal they burnt. The inhabitants sought comfort by exposing themselves to high-temperature radiant sources and any air that was warmed was allowed to drift away. That this was wasteful was realized by many people before the war, but with the post-war era official recognition was given to the need to conserve the heat. The three major sources of heat loss in a house are, of course, up the chimney in the flue gases, by conduction out through the walls, ground floor and roof (the 'exposed' surfaces), and by convection through the cracks and crannies around windows and doors and any vent holes (Fig. 6).

Recovering or retaining the heat lost up the flue is primarily a matter of appliance efficiency, and is too large a subject and too far beyond my competence to attempt to review now. There are, however, organizations which can advise you. To name two—The Coal Utilization Joint Council and The Domestic Fuel Organizers of the Ministry of Fuel and Power. As architects, what we really require is a list of all appliances for all types of fuel which at least tells us if these have passed the British Standard tests and indicates the range of efficiency to be expected from any type. Having chosen well, insisted upon good installation instructions and seen that they have been carried out, the architect can help by ensuring that the flue is inside the 'insulated envelope'. Recall that some heat must go up the flue or the fire will not burn; this being so, it may as well be used to help heat the house while in transit. This consideration often leads to a proposal to use metal flues. My advice is not to attempt them at present. Their durability is still in question. If, in spite of this, they are to be specified, I suggest that you consult the Building Research Station on the fire precautions that should be taken and carry these out rigorously.

Insulation has been dealt with earlier, so that we turn to the third factor, which is ventilation. The expert in this field, J. B. Dick of the Building Research Station, has presented a paper to the Institution of Heating and Ventilating Engineers on the results of his investigations into ventilation during the last two years at the Building Research Station.[6] I can not hope to do justice to this extremely valuable work now; at best I can but give you the conclusions I draw from his work. Last year the Building Research Station stated that in a small house a large amount of ventilation was occurring through the cracks around the doors and windows. It was shown that weather-stripping on the exterior doors of the house would reduce the rate of air change by a significant amount.

Dick's amplification of this work shows that it is the fit of the windows facing the prevailing wind that is of importance. A well-fitting window does not require scientific definition; it is simply one in which the sash comes up tight against the frame when the window is closed and does that all round. It is certain that windows in the experimental houses are not tight-fitting and it is also apparently reasonably certain that this is typical of conditions in other post-war houses throughout the country; and it appears that the windows at Abbots Langley are as poorly fitting as the cheapest type of factory sash in use in America. It is obviously possible to save fuel by spending more on better-fitting windows. The amount of openable sash can be restricted, and should be. The total amount of total window area has been left very largely in the hands of the architect and the demands of natural lighting. This arises from the study by Billington[7] on the heat gains by solar radiation, but it should never be forgotten that the heat gained by the sunshine, if there is any during December and January, will not necessarily be available in the evening; it may have

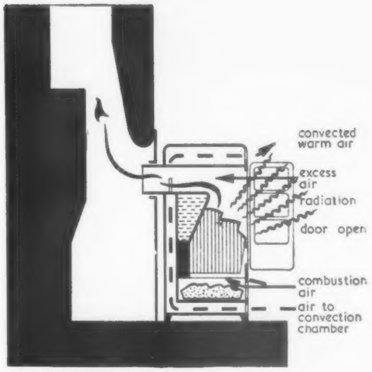


Fig. 3: Openable stove

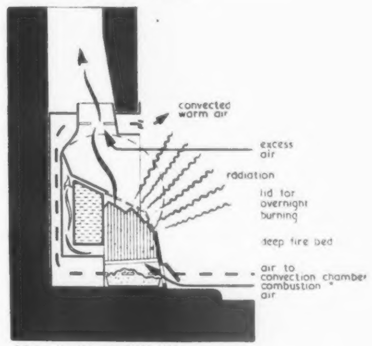


Fig. 4: Closeable fire

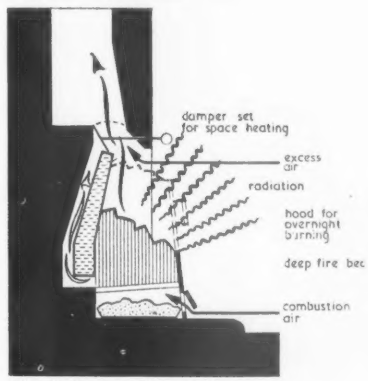


Fig. 5: Improved open fire

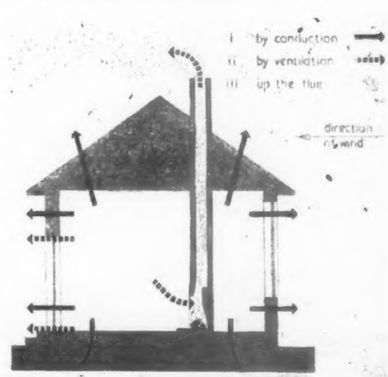


Fig. 6: Sources of heat loss

been thrown away by opening the window, and then, of course, there is nothing left to off-set the cold that penetrates the glass area later.

On the whole, if thermal efficiency is to be our objective large areas of glass for rooms in houses of around 1,000 sq. ft. are not acceptable. The general run of present window sizes is probably not far from the optimum, although there is as yet little experimental work by which to test this thesis. As to double windows and double glazing, it is true that if you have large glass areas you will have to use this in some form or other. If your window sizes remain reasonable you are advised to spend your money on well-fitting windows all over the house rather than to attempt double glazing.

It sounds rather as though this leads up to a proposal to seal the house hermetically. Far from it; there is obviously need to supply a house with a certain amount of fresh air. The Building Research Station have shown that more than enough is coming from the windows and doors when closed. What happens if we do use much better fitting windows and weather-strip the doors? And suppose that they become so well-fitting that we do not get the amount of fresh air suggested by the Egerton Committee in their Report, *The Heating and Ventilation of Dwellings?*[10] One is sometimes told terrible tales about what may happen if the air change rate is too low, and for all I know these tales may be true: what I entirely fail to understand is why the windows, in particular small opening lights, are not quite as satisfactory as any hole in the wall, which will be stuffed up anyway. I can not see why the inhabitants of this kingdom should not be considered adequately adult to judge their own requirements in respect of ventilation.

The possibility of cross ventilation should be provided. This is usually ensured by designing so that each dwelling has at least two exposures. Grilles or vents in the doors or walls of rooms to a hall can be installed to ensure that the air can find its way through, but these vents may not be necessary. The Building Research Station are assessing their value. It is still uncertain if in a small well-protected house any vents over interior doors are needed to ensure an adequate interchange of air within the house, so that a reasonable supply of fresh air is found in all quarters, even with all windows and doors shut, at wind speeds of above 10 miles an hour and regardless of the direction of the wind.

The effect of the foregoing is to emphasize that in a house that is well protected thermally, the barriers offered by internal partitions and internal doors to the movement of warmed air are of much less importance than in a poorly-protected house. This is not to say that a room without any heating in it will be suitable for 'sedentary occupations', but the Building Research Station results show that it will not be cold and will maintain a considerable temperature advantage over outside. This depends, of course, upon the amount of heat put into the house and how it is distributed—in other words the fuel and the system.

The type of system that is envisaged is one that exploits the possibilities offered by the ability to retain warm air, and this follows the general lines of the proposals of the Egerton Committee.

In the matter of fuels the work of the Building Research Station has indicated that the most economical fuel for space-heating for houses of around 1,000 sq. ft. is solid fuel, and that only one appliance burning solid fuel is economical in a house of this size. The published data [1, 3, 8, 9] show that gas or electricity is most economical for cooking when these are available. The data also indicate that a solid fuel space-heater with a back boiler produces hot water more economically than by servicing these two functions separately—whatever the fuel used for the domestic hot water. For the separate solid fuel boiler, providing nothing but domestic hot water, there is not much to be said in a house of around 1,000 sq. ft.; in a larger house, by servicing radiators for space heating, it may be very useful. Gas and electric water heaters are obviously desirable as auxiliaries when the space-heater is not in use; they seem to me essential equipment for the lightening of the housewife's work. If at present we can not afford them, let us at least design so that they may be included when better economic conditions prevail.

With these brief comments I leave domestic water heating; Weston is reviewing this subject in January to the Institution of Heating and Ventilating Engineers, but I would remind you that insulation of tanks and flow and return pipes is essential.

The foregoing conclusions are based upon the unoccupied period in the Building Research Station experimental houses, and these trials were carried out for an imaginary family of four, living to what is named for simplicity the experimental routine. This routine has been called into question, it being claimed as excessive in the amount of space-heating. To get evidence on this point is not easy; such data as are available from the Occupied Period at Abbots Langley are pertinent but far from conclusive, because the figures for ten houses during one heating season are all that have so far been computed. The mean winter temperature for all these houses was 58.9 degrees F. during the Unoccupied Period, and 58.8 degrees F. during the Occupied Period—showing therefore no difference. The mean winter temperatures for the individual houses ranged from 56.9 degrees F. to 60.4 degrees F. during the Unoccupied Period and from 56.2 degrees F. to 60.7 degrees F. during the Occupied Period—again showing no substantial difference.

In nine of these ten houses the differences between the mean winter temperatures for both periods were less than 1 degree F.; the wider variation of about 4.5 degrees F. in the tenth house is accounted for by surplus heat in the kitchen, which was conserved during the Unoccupied Period because the windows and doors were kept

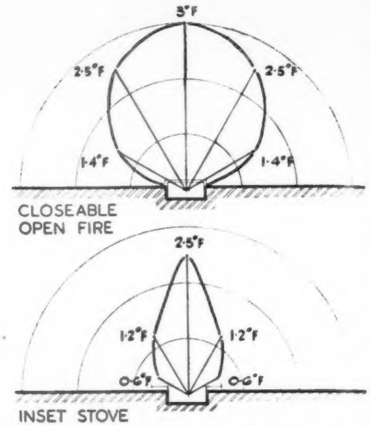


Fig. 7: Polar diagrams of radiation from two solid fuel appliances, showing globe temperature increase above air temperature at points 5 ft. from fire and 2 ft. 6 in. above floor

closed but which the housewife in search of comfort dissipated during the Occupied Period. The mean living-room temperatures of all these houses lay between 59 degrees F. and 61 degrees F., and any savings in fuel were effected by lower temperatures in rooms other than the living-rooms. I conclude, therefore, that the data obtained under the routine employed during the Unoccupied Period are not going to lead us very far astray. And these data indicate that the improved solid fuel space-heating appliances will serve our ends.

In my view the improved solid fuel space-heater chosen should not be selected purely on the differences in running costs shown in the Building Research Station data, for these variations are not very large. The selection should be made on other considerations such as first cost, ease of handling, availability of the particular type of solid fuel, appearance, and so on. There are a number of points here that could be discussed, but I wish to draw your attention to but one. Since these appliances augment with radiant heat the heat they supply by convection, there is some advantage to those who like their open fires in having a wide angle of distribution of the radiation. An improved open fire has this advantage over an openable stove; it has a wider angle of distribution of radiant heat as is shown in Fig. 7, where a polar diagram indicates the distinction. The appliance chosen will have a back boiler as reasoned earlier. It will presumably face the main living-space of the family, and it is often proposed to arrange a special route to it for the combustion air. If there are dangers that a draught will occur it is simpler to arrange a grating near the fire to the front hall rather than to install underfloor ducts.

The decision to keep to one solid fuel heating appliance does not dictate the type of plan. It is quite possible to satisfy most of the plan types that can be devised by a single improved solid fuel appliance, but spaces cut off by partitions will have to have extra heat to be suitable for

System	Mean house tem-perature (heating season only)	Winter input, therms, space and water heating, cooking	Costs—pounds a year		
			Winter	Summer water heating and cooking only	Total for year
Open fire or stove with back boiler and radiators or convection. No overnight burning. Only downstairs heated.	55° F.	800	£16	£7	£23
Closeable open fire or openable stove with back boiler and radiators or convection. Overnight burning. Only downstairs heated.	57° F.	950	£19	£7	£26
As above, but upstairs and downstairs heated and overnight burning.	59° F.	1,100	£22	£7	£29
Full central heating (coke burning).	61° F.	1,250	£25	£7	£32
Solid fuel cooker, back-to-back type, with back boiler and convection to one bedroom. Gas alternative cooking when back-to-back not alight.	56° F.	1,100	£20	£7	£27
National average expenditure.					£27

Fig. 8. Comparison of estimated fuel consumption and costs for water heating, space heating and cooking, in houses of approximately 900 sq. ft. in floor area

sedentary occupations. The problem is how to get it there without imposing high first costs and high running costs on those who can only afford to heat the lower floor. It is on this matter of the methods of distribution of heat that disagreement arises between the recommendations of the Egerton Committee and the results from Abbots Langley.

It was shown last year that the suggested systems put forward by the Egerton Committee[1] proved to be amongst the most expensive when installation and fuel costs are taken into account. If the routine employed in the tests maintained a higher mean house temperature than the lower incomes can afford the chief source of saving will not lie in the topping-up heat alone; for example, the houses employing gas or electricity for this purpose burnt only about £1 worth of fuel for topping-up and this was usually confined to the bedrooms. Not only must the topping-up be cut, but some further saving be made in first cost and in fuel. The Abbots Langley trials have revealed that which the Egerton Committee did not, and without the tests could not, know—the heat-conserving properties of the well-protected house allow for much simpler systems of distribution than they envisaged.

Because the heat finds its way around largely by convection, the ducts for background heating by convected warm air are unnecessary, and, indeed, their contribution to the background heating is not worth the cost. You may remember the story of the farmer who cut a large hole in his barn door for the cat and a smaller one for the kitten. The stairwell should suffice for background warmth. But convected warm air is mercurial and follows the ways of the wind. Even when windows seemingly fit tightly, during strong winds warm air seldom finds its way to the windward side of a house. A radiator has this advantage over a warm-air duct, that it will put heat, ultimately in the form of warm air, in the room required. On these grounds alone, as a distributing medium hot water is much to be preferred. It frees one, too, from the gloomy prophesies of fire experts and vermin specialists concerning warm-air ducts. Since the solid fuel appliance is equipped with a back boiler it is obvious that this can be used to supply some radiators. But were the proposal to heat the whole of the house to 30 degrees F. above outside, the firebox would have to be so increased in size that it would become uneconomical. Many makes of appliances with back boilers allow some 45 sq. ft. of radiator surface to be taken off without endangering the hot water supply; this requires the use of an indirect cylinder, the radiators being fed from the return of the primary circuit. The architect's problem is to dispose this radiator surface strategically in lieu of the ducts and topping-up apparatus proposed by the Egerton Committee.

If the solid fuel heating appliance serves the living-room, and if, following usual practice, the kitchen is cut off to prevent cooking smells permeating the house, then the kitchen should get first priority. Even in a well-insulated house, a gas or electric cooker will not keep the kitchen up to the 60 degrees F. that seems to me essential for the housewife's main working-space. The dining-space may need some assistance, depending upon how it is partitioned off from the rest of the ground floor, and where it is located.

As to the bedrooms, if there is still heat to spare I suggest giving the remaining radiator surface to one of the larger ones. The possibility of continuous heating to around 65 degrees F. in a bedroom, particularly with so safe a device as a radiator, is very necessary in family life. The room is then one where an infant can play and a child be left without fear that when boredom sets in elementary experiments in the behaviour of fire may ensue. If there is a second large bedroom, it may well be equipped with a gas fire. The preference for gas rather than electricity is on the assumption that usually the heat is cheaper per therm and is achieved at an advantage in coal economy. The fire hazard of radiant heaters leads me to plead for convection heaters.

My former colleague, Dr. Weston, has computed for us the costs of variations of such systems run with and without overnight burning. These are set out in the table in Fig. 8, and include for a solid fuel cooker in rural areas. The costs run between £23 and £29 a year (8*s*. 9*d*. to 11*s*. 3*d*. a week) for space and water heating and cooking, which give a reasonable grouping around the national average of £27 a year. The mean house temperatures are around 55 degrees F. to 59 degrees F., and are quite as good as many of the more extravagant 'Two-stage' houses in the Abbots Langley trials. The winter input therms for space and water heating range from 800 to 1,100. These estimates apply whether you use convected warm air or radiators, openable stoves or improved open fires, and allow for gas or electric summer water heating. Comparative capital costs I have not got, but obviously they will all lie between the 'Partial' systems in the Abbots Langley experiments and the 'Two-stage', and an allowance of an extra pound or two a year should meet the amortisation of extra capital cost above the cheapest house in these trials. The system is capable of some flexibility to suit various tastes and pockets, and should not impose hardship. It should be noted that the difference between the three systems using radiant solid fuel appliances is largely a matter of the degree of space-heating supplied, and is one that lies between that offered by the 'Partial' and the 'Two-stage' systems discussed last year.

The comparison with full central heating is given because this method remains an economic possibility, provided that one dispenses with the open fire. The reasons for this are partly the cost of burning extra fuel, partly the cost of providing another flue, and partly the constant loss of warmed air up the flue, which can only be reduced by inserting a damper to be closed when the fire is not alight.

The provision of these systems in houses that are thermally well protected leaves freedom in planning, and certainly more so than many of the more complex proposals of the Egerton Committee, and it is less

restrictive than the old pre-war system with three or four or more solid fuel flues with the worry of positioning the hearths in relation to doors and windows, but the question is often asked, do they permit of the Open Plan? By the Open Plan I take it we mean a house in which on the ground floor only the kitchen is partitioned off. My answer is that such systems are not suitable for the Open Plan, and that the stairs must be cut off from the main room, otherwise too much heat will go upstairs. The front door must also be partitioned off. But the dining-space may be incorporated with either kitchen or living-room, as the designer sees fit.

If it is desired to use the Open Plan then other systems of heating are essential, such as radiators, panel heating, skirting-board heating, or forced warm air. It is only essential to use the Open Plan when forced warm air is blown from one point and the whole house is to be fully heated most of the time. But with the Open Plan heated by any system care must be taken at the stairwell to ensure that too much warmed air is not going aloft and that cold draughts are not coming down and causing annoyance in the main sitting-areas. This, and many other points concerning whole house heating, could occupy the rest of this paper. There is, however, a far more important aspect to which I would turn your attention, and that is the wastefulness of nearly all our present methods of heating, which can never be really economical so long as buildings and the spaces within them are standing for long periods heated but unoccupied, because when no one is present to enjoy the warmth the room might as well be lowered to the temperature required to prevent condensation.

This point has been made by many persons before the author, but the results from Abbots Langley can be used to demonstrate it. Fig. 9 is one used last year [11] to show the average hourly temperatures for each hour of the day over the whole heating season as against the routine required in the living-rooms of the houses. The space between the two has been hatched to indicate the temperatures above that required by the routine, which may be regarded as an index of heat wasted and fuel burnt to no purpose. If the structure had cooled off quickly and equally quickly had come back to the temperatures required, our mean hourly temperatures would have followed the line of the experimental routine. Could we but achieve this high degree of flexibility it is apparent that by reducing the room temperature when no one was there we could lower the mean house temperature. This would lead to a saving in fuel.

It must be remembered that it is not enough merely to have a heating device that switches off and on as required, because there is a lot to be heated up initially—the air in the house or room and the structure of the house or room. Indeed, it would be really economic to have the heat required induced in the surrounding surfaces by the passage of a human being through the building. Technically, I am told this is possible, but at great cost and

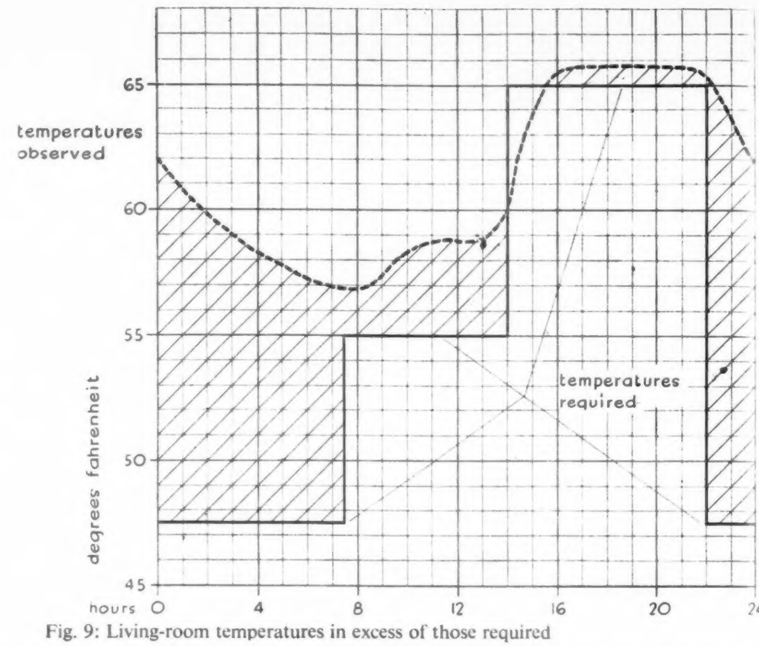


Fig. 9: Living-room temperatures in excess of those required

with one preponderant snag. High-frequency low temperature radiation could be induced in surfaces in this manner without any ill-effects to man, but if he had any metal on his person, such as pennies in his pocket, or his watch, these would quickly become warmed almost to combustion point. So it seems that this form of heating cannot be considered until the Plastic Age, when the Mint replaces cupra nickel with polyvinolchloride. At present it is thought that the key to this problem lies in the thermal capacity of the structure. If we can build structures of sufficiently light thermal capacity to vary quickly according to our needs, then we may hope to save this unused heat indicated by the mean winter temperatures.

This is a subject in which calculation is so complex as to be of little assistance. The Building Research Station are undertaking full-scale trials to prepare the figures for us. I think I am right in saying that they are now pushing out into the unknown, and certainly on a course which the previous trials suggest will be hopeful. The houses in the trials are chosen from among the alternative methods of house construction (the 'permanent pre-fabs') that have been with us for some years now. They are selected mainly for the variations that the structures offer in thermal capacity, from a heavy no-fines concrete structure to a light steel frame with panel infilling. The trials now in progress have given the norm for 'traditional' structures.

The effect of these trials on our whole outlook could be tremendous. For instance, the materials used for factory fabrication of large units are nearly all of light thermal capacity. It may be unwise to start speculating yet, but one can not help wondering whether the possible saving in fuel may not be sufficient to swing the case for prefabrication over beyond argument. Further, this is not merely a matter of heating houses but an issue for all types of building. Already the demand for better heating means that not only houses, but factories, offices and schools are standing uninhabited for long periods, at temperatures well above that required to prevent condensation. The temperatures in these structures represent heat that has come from some source. And as noted earlier, in this country nearly all our space-heating comes from coal. Can we save an amount significant enough to require the use of materials of light thermal capacity? If so, we may look forward to quite a change in building techniques. But at present the Building Research Station are only at the beginning of building these houses and the figures and facts are but remote.

An alternative would be to find another indigenous fuel or source of heat. Atomic physicists have been so cold about the future of atomic power that one is almost persuaded to believe them, and to overcome one's wishful thinking. Let us set them aside and turn to the possibility of increasing the useful heat we obtain from the sun. The Americans, rich in fuel resources of all types, are experimenting with the possibilities of solar heating; again they are wealthier than we are even in sunshine. In Figs. 10 *a*, *b* and *c* you see the solar house built by the Massachusetts Institute of Technology at Boston, U.S.A.[12] The large cold frame on the top of the house absorbs the sun's radiant heat through the glass and heats the water in the coils; this heated water is stored in tanks until the heat is required. Well, we have far fewer days of sunshine here than in Massachusetts. There seems little hope of carrying the whole heat-load by such

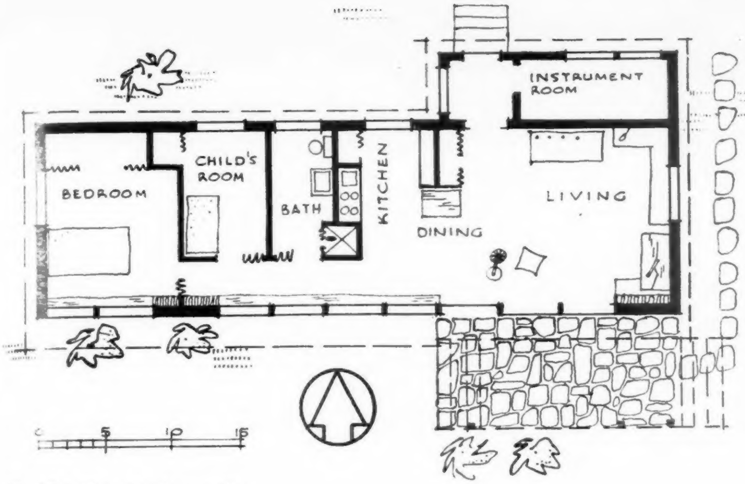


Fig. 10a: The solar house plan

devices, but my curiosity leads me to ask for a trial that will settle the amount of heat we might expect to obtain in such a way. It might be a boon if we could obtain our hot water in summer from this source.

However, this is not the only way of recovering to ourselves the sun's heat. Even in these misty isles it finds its way through to the earth and the air and water, from which it is recoverable by the heat pump or the reverse refrigeration cycle. The comments of American investigators are that the heat pump is not economical unless it is expected to provide refrigeration for one-third of its time in summer—and refrigeration in summer is seldom needed in Britain. None the less, T. G. N. Haldane, past President of the Institution of Electrical Engineers, has the credit, as far as I know, of being the first man to heat a house with the heat pump, which he did in Scotland, and I suggest that the time is ripe for a further attack on this source of energy for house-heating. In view of the differences between calculation and result evidenced by the heating trials, I hope that the attack will be on a full scale.

However, returning to the present, I have argued out in detail my conclusions. I appreciate, however, that what architects really require is a summary for use in the draughting-room. Here then in brief are the ten conclusions I draw.

1. The house must be insulated to U values of 0.20 to 0.25 for walls. This can be done economically by using unventilated cavity walls with brick outer leaf and inner leaf of either foamed slag, clinker concrete or hollow clay block; these are plastered direct. For ground floors, solid concrete rafts finished preferably in timber block or with asphalt tile or bitumastic. Pitched roofs should be insulated with glass silk or mineral wool laid on or between the ceiling joists.
2. Windows and doors must fit snugly; this means using good quality fittings and ensuring accurate positioning of the hinges. External doors should be weather-stripped.
3. No flue should be on an external wall.
4. For space-heating the objective should be a single solid fuel appliance with back boiler attached, and of sufficient size to take at least 30 sq. ft. of radiator surface as well as heating water for domestic use. The downstairs should receive prior service in space-heating. Electric immersion or gas multipoint heaters or circulators are desirable.
5. When convected warm air is used, this should be emitted on the ground floor and the feed for air to be heated taken from the hall. Under-floor ducts for combustion air are usually unnecessary.
6. Cooking should be done by gas or electricity when available. In rural areas solid fuel cookers will be required and extra solid fuel space-heaters may then be necessary.
7. Hot water storage tanks should be lagged with 1 in. of insulation. When used in conjunction with gas circulator or electric immersion heater for summer use 3 in. of insulation should be used and a removable cover provided.
8. Any tanks or pipes in the roof space must be insulated; the ceiling insulation should be carried up over the tanks.
9. Water pipes should be kept off external walls and the layout, particularly of hot pipes, kept compact. Flow and return pipes from boiler to hot tank should be insulated.
10. Air bricks to outside are bad practice in any rooms except larders. If some form of permanent ventilation is to be supplied to a room without a flue, vent to the roof space with an opening of 30 sq. in. free area. The roof space must then be vented, but normal air leakage around soffit and fascia of eaves can take care of this.

In this paper I have attempted to sum up my conclusions drawn from the recent research in domestic heating. I am greatly indebted to the Director of Building Research of the Department of Scientific and Industrial Research and to his colleagues for most of the factual matter, in explaining which their patience has been unflagging. It must be noted, however, that the views expressed are mine.

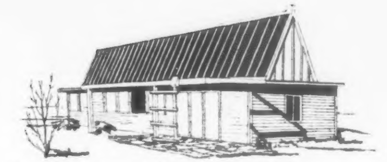


Fig. 10b: Perspective of solar house

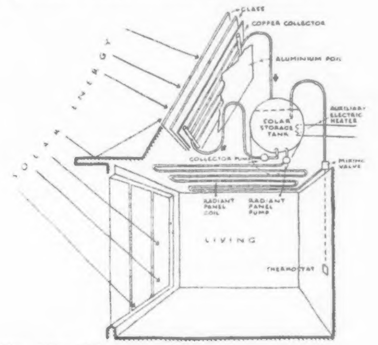


Fig. 10c: Diagram of solar house system

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DISCUSSION

Dr. W. Davidson: Mr. Eve has examined the standard of heating which can be afforded by the lower income group, namely, something of the order of £20 to £25 a year for all heat services, leaving only £13 to £18 for space and water heating. Using the improved appliances one can only for that expenditure heat the ground floor and give no heating to the rest of the

house. Of these various improved appliances Mr. Eve has rather pinned his faith on the open fire or openable stove with back boiler, and providing the background heating by hot water radiators.

If it is ducted in a proper fashion, one can get equally good results with convected warm air, which offers certain advantages and flexibility over the radiator method. For example, if the lower income group can only afford to heat the ground floor they can have the whole of the heating in the living-room; if someone can afford a little more, then the background heating upstairs can be provided from the same system. With the radiator system it would be impossible to give that flexibility.

The tests which Mr. Eve has referred to show that by using highly-efficient and thermostatically controlled appliances, one can get a very good standard of whole-house heating and a plentiful supply of hot water within the range of expenditure which he gave, and I feel it is possible to give this higher standard of heating with even less expenditure on fuel than he has indicated. This can be done only by attention to the insulation of the house and choice of appliance.

To get these standards of whole-house heating within the range of expenditure quoted a very highly efficient appliance must be used, something giving at least 70 per cent. To get the cheapest form of heat one would require to use cheaper grades of fuel, and it is possible to design an appliance which will give you those high efficiencies of 70 per cent or over using ordinary coal, even slack coal which, of course, is very much cheaper. Now when those appliances are used in conjunction with a forced warm-air system there is the advantage of a flexible system of good temperature distribution within the room very much better than the standards indicated by the open fire and the radiator heating.

A very quick heating-up can be got, so that if the house were to cool down overnight, if it is of low thermal capacity, the temperature can be brought up very quickly in the morning. It must be remembered that with that form of heating an open fire can not be afforded, but no doubt those who have the choice to make, and who have experienced a good heating standard, would be prepared to dispense with the pleasures of an open fire and the poor standard of heating that it gives, if they were going to be heated cheaply and well by a forced warm air system.

Mr. Gilbert H. Jenkins [*F*]: I gather that we shall have eventually some actual figures given to us of the comparative cost of solid fuel, gas and electricity. I have endeavoured for some years to get those exact comparative costs and I have failed, but I am sure it would be a very great advantage to architects if they knew what those comparative costs were.

I see in the publication mentioned that you have to build your house with traps in order to remove the iron pipes around which you convect the heat; would it not be advisable to build fireclay flues instead of the iron; would they not last much longer? It seems to me that many of the buildings which are being put up are going to have a very short life and the cost of upkeep so considerable that they are going to be a burden on our rates. It would be far better to spend more capital in order to avoid an enormous upkeep.

In order to secure reasonably air-tight windows, does not it mean the abandonment of the present quality wood that we are able to obtain and shall we not have to go in for metal windows, whether we like it or not?

Another question is concerning alternative methods for achieving the amount of insulation which would give architects some chance of designing the exterior of the building in the materials that they desire. I gather that if we go in for decently-constructed hollow walls we can achieve that result with several materials. I take it Mr. Eve is of the opinion that no roof should be constructed, either of slates or tiles, unless there is solid boarding and some kind of insulation. The question arises whether, at very little extra cost, counter-battening would not deal with that matter of insulation.

Mr. Sven M. Sternfeldt [*L*]: I was disappointed to hear that double windows, or double glazing are uneconomical. One pane of glass transmits 1.1 B.T.U. and two panes transmit .54 B.T.U., so that thereby you halve the amount of heat lost. Even keeping our own present rather meagre standards of illumination it is worth while putting in double glazing, and if it is worth while doing that why not have larger windows and gain solar heat?

Mr. D. C. Lewis: I am sorry to hear of Mr. Eve's unhappy experiences with double-glazed windows. They are very common in the northern part of Germany and in Switzerland, and I have never heard anybody there complaining of having had the same experience. In fact they speak very highly of them, and the double window, in my opinion, is one of the fundamental contributions to the very low fuel consumption per head of the population for domestic heating in Germany.

I was glad that Mr. Eve brought out that point of fire and scalding hazards for children. In nurseries and nursery schools not only is fire from the actual elements a danger to children, but little children of two or three can burn themselves on a simple hot water pipe upon which we all here could bear our hands very readily, and in such places we now place any domestic hot water pipe within reach of the adults for towel rails or anything of that order, but out of reach of the under-fives, and it is a practice I could recommend to all architects.

The author also mentioned the 'open plan': from a heating point of view that is really commendable, and there is one way of overcoming the objection he mentioned about the warm air rising from the living-rooms into the bedrooms up the open staircase, and that is by reversing the planning and putting the living-rooms on the upper floor and the bedrooms on the lower floor. From the heating point of view you have your thermal convection in the right direction and you are keeping your kitchen smells away from the bedrooms.

Mr. J. Sykes: In the provisional report of a discussion about a year ago we were told that the windows were of the ordinary type and when fitted were not satisfactory, and since then additional fittings had been used. With additional fittings, can even the light type of window be regarded as satisfactory?

Mr. J. S. Hartley [*A*]: In the case of houses which are very well insulated is there any necessity for the lagging of the hot water cylinder to the extent which Mr. Eve recommends? If we do that we are certainly losing the value of an airing cupboard, if the hot water cylinder is placed in an airing cupboard, and if the house is adequately insulated to prevent the passage upward of hot air then surely with an uninsulated cylinder we are providing something in the way of a radiator in a very central position, which would do quite a lot towards heating the upstairs of a house.

In reply **Mr. Eve** said that a paper by Dr. Weston, obtainable from the Building Research Station, gave some idea of the comparative cost per therms in houses of about 1,000 sq. ft.

Regarding warm air convection ducts, if the fire experts go forward with their proposals as to what should be done to prevent spread of fire by these ducts, it might be as well to abandon them at once. He thought it better to return convected warm air direct to the ground floor and let it rise through the living-room door, but results would be disastrous if the windows did not fit.

In the province of Quebec the price of pre-war double glazing set in one frame was prohibitive, and the double sash removal and replacement in spring and autumn, and storage, were a trouble. In America there are a large number of double windows available which were very suitable for office buildings, hospitals, and so on, but housing was under discussion that evening.

The additional fittings to windows were put on before the heating trials at Abbots Langley began; the windows were originally of the lighter type, and subsequently a heavier type of sash was introduced. He understood that work was going on at the Building Research Station regarding various types of sashes, and when the report appeared it should clear our minds on this important matter of window fitting.

It was quite true that a hot water cylinder in an airing cupboard would act as a radiator, but he thought it somewhat injudicious; the real purpose of the cylinder was to obtain hot water, and if gas or electricity were being used it meant, practically, that space heating was being provided by that means, and he thought it better to confine the heat to where it was wanted. An unlagged hot water tank could be unpleasant during the summer months.

Regarding the question of costs, it was unfortunate that he who paid for the building did not have to pay for the fuel bill.

Some Practical Notes on the Nature and Application of Laminated Plastic Veneers and Panels

By S. P. Jordan, M.S.I.A. [*A*]

New Materials. We are all by instinct cautious of new materials, and rightly so. Manufacturers' claims are one thing; substantiation of these claims in service is another. This has always been the way with ideas and materials, and attempts to interfere with the natural order of things may involve risks to professional reputations.

All the more is this the case when a material, or group of materials, attracts the non-professional eye and receives publicity. This may well lead to temporary prejudice, which can be accentuated by insufficient understanding of the nature of the material itself, resulting in incorrect use, perhaps combined with bad workmanship.

These words apply particularly to the new synthetic materials known generically as 'Plastics'. There is no long tradition in this country either of design or fabrication to give understanding and confidence. The patronymic itself implies something rather insubstantial and transitory: it is an unfortunate and misleading generalization which could well be abolished in favour of more specific terminology.

Two Main Groups. Plastic materials are defined as those capable of being moulded into forms by the application of combined heat and pressure. The 'Plastics' industry is concerned with two main and widely differing groups of such materials known as 'thermo-setting' and 'thermo-plastic'. As a simple analogy, a brick is thermo-setting; formed from clay, it is fired and can not afterwards be returned by heat to its original plastic state and re-formed. Conversely, glass is thermo-plastic.

The plastics industry has grown round these two basic groups, and it should be noted that the first uses of the resulting materials in both groups were industrial. In terms of quantity this also holds good today, though many grades have since been developed for household and everyday decorative and functional applications.

It is not the province of this article to argue the particular merits or demerits of these materials. Basically they have come to stay; that is certain. To simplify an understanding of the nature of the two main groups, we may consider the thermo-setting group to include the high pressure laminates, and the thermo-plastic group to be mainly confined to the field of plastic mouldings and extrusions. It is the thermo-setting laminates which are of chief interest to most architects, so we may briefly review the manufacturing process and then consider applications.

Manufacture. It is fairly generally known that the raw materials used in the manufacture of laminated plastics are a variety of papers (or fabrics or wood veneers) combined with a variety of synthetic resins; the paper, in continuous rolls, passes through the resin bath picking up a precise quantity of resin, and is then dried to a precise condition by infra red lamps. It is then cut and 'built up' to a certain weight, the coloured or patterned surface sheet is laid on top and a combination of heat and pressure does the rest. This is an absurd over-simplication, but will serve as illustration. The first point to realize is that the board is given its finished appearance during this process. Afterwards it is trimmed and may receive surface adjustment, for instance by being rubbed down by an abrasive to get rid of the high gloss imparted by the stainless steel plates during pressing. Basically, however, the finish given at this stage is the ultimate finish, and it is of the utmost importance to appreciate this.

To the manufacturer this represents a major problem, since the boards are handled through various processes after coming from the press and there is considerable risk of surface and edge damage all along the line between the press and the end use, via the distributor or fabricator. There are many other worse headaches for the manufacturer however, particularly under current trading conditions.

Some usual sizes for these boards are 9 ft. by 4 ft., 8 ft. by 4 ft., 2 metres by 1 metre, etc. Thicknesses vary normally between the standard $\frac{1}{16}$ in., normally intended for veneering to a backing, and the $\frac{5}{32}$ in. panel. The $\frac{1}{16}$ in. veneer is usually supplied with the reverse side ready sanded. The $\frac{1}{8}$ in. or $\frac{5}{32}$ in. panel is usually supplied with the identical finish imparted to both sides. This is done in order to provide as balanced a panel as possible and so reduce the risk of warping to the minimum. Laminated plastic boards absorb moisture through their edges, and even to some extent through the surface. It is also noteworthy that the provision of a different coloured reverse will probably result in a panel less well balanced in this respect: an incidental advantage in having the same colour both sides is the provision of an alternative surface in the event of superficial damage. The 1 in. structural internally-ribbed panel, which also has a wide field of application, does not come within the scope of this article, particularly with reference to handling, forming, and the reproduction of special designs.

The curing of the constituent materials is effected by the inter-action of controlled pressure and temperature. Pressures are used which are beyond the normal appreciation, up to 5,000 tons being not unusual. The maximum curing temperatures hover round the 160 degrees centigrade mark. Although it has been stated that these laminates are thermo-setting, and once formed can not be altered by reheating, this must be qualified to a certain extent.

Fig. 1: The Yacht Club bar, designed for Gaskell & Chambers by Clive Entwistle [*F*]. Mural by R. Myerscough Walker, processed in plastic by Messrs. De La Rue

Where it is required to bend the formed sheets in the workshop, assistance can be gained by quick application of heat up to a maximum of about 160 degrees C. It is also possible to produce special post-forming industrial grades capable of being shaped in a mould: built up with fabric laminæ, relatively deep draws can be obtained. The subject of bending is covered in more detail later in this article.

Handling. The crate arrives from the manufacturer containing the required number of boards of the selected finishes. There is normally a charge of about £5 on the crate which is cancelled on its return to the manufacturers. Care in handling the boards is essential at all stages. A board measuring, for instance, 9 ft. by 4 ft. by $\frac{1}{16}$ in. thick is not difficult to damage, and it is possible to cause it to break across the centre if carried in a sagging condition. It is quite possible for a board of this size to be carried safely by one man; it is equally possible for it to be seriously damaged when carried by two or even four men.

Stacking. Stacking of the boards is worth careful consideration. Boards should never be left leaning against a wall so that they develop a sag. A recommended practice where quantity is concerned is a storage structure made so that boards are supported at an angle like the pages of an upturned half-open book and held firm with wooden blocks. This has several advantages, including the ease of removing any sheet from stock without risk of damage to it or its neighbours. Where only small quantities are concerned, boards should be laid flat and protected from abrasive or other possible damage.

These precautions have been included at this stage to help to give an appreciation of the nature of the material. The boards are tough and have excellent properties when considerately handled and installed. The potential range of surface finishes is very extensive, and the scope in their use considerable.

Principles of Use. Broadly speaking, there are two main methods of use. The $\frac{1}{16}$ in.

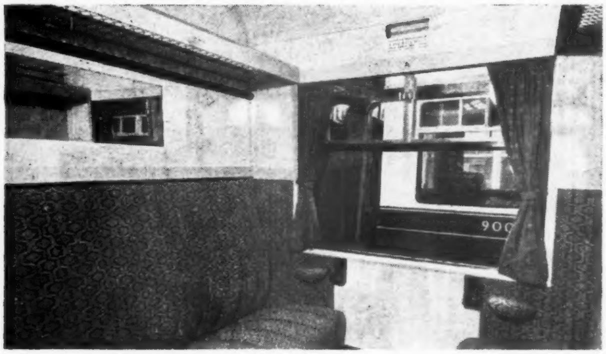


Fig. 2: (left): Western Region coach in laminated plastics, designed by S. P. Jordan [*A*]. Fig. 3: (above): Model for railway coach panelled in laminated plastic. Designed for Messrs. De La Rue by S. P. Jordan [*A*] and W. J. Hardman

sheet veneered to a plywood or composition board backing, or cemented to an existing solid surface, and the $\frac{1}{8}$ in. or $\frac{5}{32}$ in. panel, self-supporting, and held in position by cover mouldings or cemented direct to a frame. It is normally inadvisable to cement the $\frac{1}{16}$ in. veneer direct to a frame owing to the tendency for the form of the framing to be revealed on the surface of the sheet through uneven movement as between the timber frame and the sheet itself.

Planning for Use. Owing to the relatively high initial cost of laminated plastic boards, careful planning is essential in their use. Considerable saving can always be effected by planning out the job with the sheet size in mind and by preparing cutting diagrams to minimize the off-cut material. If required, most manufacturers will supply panels cut to required sizes, but it is worth remembering that the panel will be relatively more expensive, apart from the small cutting charge, if the resulting off-cuts are awkward sizes or shapes, so this does not relieve the designer of his 'planning' responsibility. It is not economically possible for a manufacturer to produce boards to dimensions other than those of his presses. A press produces boards of that exact size, neither larger nor smaller.

Quality and Cost. The quality and wearing abilities of boards of different manufacture vary quite appreciably, but it would be exceeding the scope of this article to go further into this aspect. In general these materials have proved their worth under extremely arduous conditions of service.

Comparative tests can always be undertaken by potential users, and this is frequently done in cases where large quantities are required for a specific job, such as table tops for chain cafés. Another major factor, naturally, is cost. Cost is always relative, and when considering the use of laminated plastics, it should be viewed in correct perspective.

The initial cost of these materials is generally high, due to the expensive manufacturing processes and the high cost of raw materials, particularly certain types of resin. The quantity of material required for instance to panel the whole interior of a railway carriage or other public service vehicle will raise the construction cost of the vehicle considerably when compared with the use of traditional materials, such as painted, veneered or otherwise treated plywood. (Figs. 2 and 3, above.)

An equally considerable saving, however, is effected in long term maintenance, since not only is the actual cost of frequent painting, varnishing, etc. abolished, but the vehicle is never out of service for this reason and thus losing revenue. Also it must be realized that under current conditions vehicles are often allowed to deteriorate in service for too long before being re-painted, whereas plastic panelling can be maintained in a permanently clean and attractive condition by ordinary soap and water.

These arguments apply equally well to many different applications of laminated plastics, particularly in connection with buildings of public use liable to heavy wear and tear, and the rising production curves of these materials reflects the growing appreciation of these factors. Laminated plastics, of course, have many more 'positive' as well as 'negative' qualities. Apart from the normal colour ranges supplied, it is possible, with limitations, to reproduce special designs into the surface by various techniques, and another attraction is the standard production of a 'cigarette-proof' grade, made by including a heat-dispersing lamina of aluminium foil just beneath the surface.

Physical Characteristics. *Sizes:* Some usual sheet sizes are 9 ft. by 4 ft.; 8 ft. by 4 ft.; 8 ft. by 3 ft.; 76 in. by 38 in. (2 m. by 1 m.); 4 ft. by 4 ft.

Thickness: Standard thicknesses are $\frac{1}{16}$ in. (1.6 mm.), $\frac{1}{8}$ in. (3.2 mm.); $\frac{5}{32}$ in. (4 mm.); it should be noted that industrial laminates can be obtained through a far greater range of thicknesses, from a single processed lamina up to several inches; these materials are normally sold by weight and are used for a multiplicity of industrial applications such as silent gears. They are usually either brown or black; they have the advantage that the colour is the same throughout the thickness, and they can be of considerable use to architects for skirtings, counter edgings and trim. Quite complicated sections can be machined from the sheet, and in the case of many components the result is well worth the initial cost.

Surface: Surface finishes are glossy, satin and matt. With the $\frac{1}{16}$ in. veneers the reverse is normally ready sanded to provide an adhesive key, the $\frac{1}{8}$ in. and $\frac{5}{32}$ in. panels being usually provided with the same finish both sides.

Edges: Sheets ex-works have shear cut, or rough sawn, edges with the core showing as a dark brown line.

Weights: $\frac{1}{16}$ in. single-sided approx. $7\frac{1}{2}$ oz. per sq. ft.; $\frac{1}{8}$ in. double-sided approx. $14\frac{1}{2}$ oz. per sq. ft.; $\frac{5}{32}$ in. double-sided approx. $18\frac{1}{4}$ oz. per sq. ft.

Temperature Resistance: Unaffected by extreme dry cold and withstands heat up to approximately 132 degrees C. (265 degrees F.). Will not normally support combustion nor spread flame. Resistance of surface and colour to injury from boiling water; the cigarette-proof grade, containing a layer of aluminium foil below the surface to disperse heat, gives maximum resistance to burning heat.

Moisture Resistance. Surface and colour unaffected by water above freezing point. Outdoor exposure to be avoided or surface and colour may deteriorate.

Chemical Resistance: Unaffected by organic and dilute mineral acids, alcohols and oils. Face surfaces of some makes highly resistant to alkaline solutions.

Dimensional Stability: With the $\frac{1}{16}$ in. veneers this depends largely on the stability of the backing material; heat and moisture effects are likely to be complementary, thus giving considerable dimensional stability under normal conditions. The thicker panels are exceptionally stable under normal conditions relative to their thinness.

Flexibility: This varies with sheets of different manufacture owing principally to the use of different resins. It also depends on the size and shape of the piece to be bent and whether the face surface is on the inside or outside of the bend. It is possible to spring the $\frac{1}{16}$ in. veneers cold to quite small radii, but the application of heat is normally essential for a radius of less than approximately 6 in. With heat a radius of down to about 1 in. is sometimes possible, and certain 'post-forming' grades with fabric or solid aluminium core can be radiused to a fraction of an inch. These post-forming grades are not always available, particularly in the decorative field, though the latter variety is now in growing production. Where a whole sheet of standard material is to be bent, the application of heat through the medium of an oil bath or industrial oven is apt to prove difficult for the average fabricator. In such cases it is wise to approach one of the ply-

Fig. 4: Kitchen cupboards and wall surface in laminated plastics. Designed for Messrs. De La Rue by S. P. Jordan [*A*]

wood firms who are used to bending large sheets and are properly equipped to do it.

The $\frac{5}{32}$ in. panels are exceptionally rigid, but they can be sprung cold to curvatures of approximately 30 in. radius; again, the figure varies with panels of different manufacture; heat is essential for curves of smaller radius and for setting curves.

Tropical Applications: Repels attacks by vermin, white ants and termites, and will not support fungoid growth.

Hand Tooling. This section is intended for the fabricator, but the information given may be helpful to designers in their appreciation of the nature of the material. *Laminated plastics are best fabricated using workshop machines*, but sharp hand tools and light power drills can be used in trimming and fitting on the site, and also where fine edge finishes are not essential.

Sawing: A fine tooth tenon saw, cut shear and with slow set, can be used for cross cutting strip; a firm quick-cutting action is best. An alternative is the engineer's hack saw with a fine tooth high-speed-steel blade. A brass worker's hand saw, or sharp metal-cutting saw will also serve for narrow-cross-cutting. Unbacked veneer can be incised with a scoring hook and snapped off against a bench edge. A portable electric circular saw is useful for straight cuts in veneered work, and in a well-supported $\frac{1}{8}$ in. or $\frac{5}{32}$ in. panel; the saw must have fine sharp teeth and be set for a shallow cut.

Drilling: All drilling should be done with the work held firmly against a backing of wood or scrap plastic sheet. The wheel brace is better than a slow-speed hand brace; a high-speed light-weight electric drill is still better.

Sanding: An electric disc sander, with coarse non-clogging grit, is best for cleaning and abrading glueing surfaces.

Dressing: For dressing veneer butt joint edges, a medium weight iron plane, set very sharp and used with firm quick strokes, gives good results; it is also useful for bevelling or radiusing panel edges; a tungsten-carbide tipped blade gives best results. A sharp joiner's scraper, held firmly and drawn deliberately along the edge will give a smooth bevel. Final dressing can be carried out on bevelled or radiused sheet with fine steel wool and some light machine oil to remove bloom.

In general laminated plastics are tough and poor heat conductors; tools quickly heat up, and they must be kept sharp and the work held firmly; short bursts of firm quick action give best results.

Applications. The number of potential applications for laminated plastics within an architect's practice is considerable. The following headings are included as a guide, bearing in mind that almost every heading covers a variety of specific uses other than those suggested.

Hospitals and Clinics: Research and Industrial Laboratories: bench tops, operating theatre wall panelling, window sills, bedside cupboard tops. lavatory and bathroom panelling, shelf tops in ward sanitary lobbies, etc.

Kitchens, Bakeries and other places where food is prepared: preparation tables, cupboards and shelves.

Hotels, Clubs, Hostels, Restaurants, Canteens, Cafèterias and Cafés: table tops, trollies, dados, etc.

Public Houses: Cocktail, Snack and Milk Bars: barcountertopsandfronts:shelves,etc.

Community and Health Centres: Holiday Camps.

Wholesale and Retail Shops and Stores.

Banks and Post Offices: Municipal and Public Buildings: Office Buildings: Passenger Lifts.

Schools, Technical Colleges, Institutions and Libraries.

Bathrooms, Wash-houses, Lavatories.

Private Houses and Flats: Prefabricated Housing.

Road, Rail, Sea and Air Transport Stations and Administrative Buildings.

Railway Coaches, Trams and Buses, Passenger Vessels and Aircraft.

Furniture and fixtures of many types: cocktail bars and cabinets, large radio cabinets, showroom fittings, service cabinets and trollies, pre-fabricated partitions and doors, bookshelves, skirtings, etc. (Figs. 4-7.)

Reproduction of Special Designs. Very considerable research has been carried out by manufacturers into the whole question of reproducing special designs into laminated plastic sheet. Some remarkably successful results have been achieved and some dismal failures. The limitations of processing special designs are now fairly well understood in so far as they apply to current production techniques. Basically there are four principal methods which can be employed.

1. Letterpress printing.
2. Silk-screen printing or hand drawn designs.
3. Engraving.
4. Inlaying.

It must be realized that in most cases where designs are incorporated into the sheet during manufacture, they should be carried out on special paper and with special inks which are obtainable by arrangement with manufacturers. Ordinary artists' colours and papers will not normally stand up to the combination of heat and pressure.

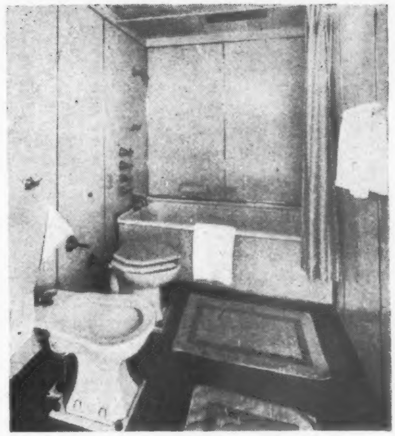


Fig. 5: Bathroom on the Queen Mary, panelled in laminated plastics

The best method of reproduction to employ depends on the ultimate purpose. For instance, if the design or pattern is likely to be seen at close range, or for other reasons requires perfect definition, silk-screen or letterpress printing is probably the most suitable.

With the silk-screen method, the artist does the design, the printers cut the stencils, making a photo-stencil for quantity or repeat runs, the manufacturers supply the inks (to match the artist's colour samples) and the paper to the printer, and the press does the rest. That is an over-simplification, as many decisions have to be taken and much special work goes into producing special designs. Over-printing is usually unsuccessful at the present time owing to the risk of blistering in processing. The artist must realize this and design accordingly. He must also be 'au fait' with the normal limitations of silk-screen printing, and in general keep the design as simple and in as few colours as possible, and within the limits of size stipulated by the manufacturers.

An early meeting between the artist and representatives from the manufacturers and the printers will save time and possible disappointment later, and it will enable the artist to learn some of the tricks of a new trade, and to establish proper relations with those who will be processing the results of his own endeavours. (Figs. 8 and 9.)

Hand-painted designs can be processed successfully, the biggest problem being the difficulty to the artist in working with the special inks on paper which is rather like very thin blotting paper, and the necessity to keep the spread of colour thin and even. Bad blistering can occur during processing if the colour thickness is too great or uneven, since the paper might not become thoroughly resin-impregnated. Once this blistering occurs, little can be done, and it almost certainly means the ruin of the pressing and a considerable waste of everybody's time and money. (Fig. 10.)

Other media than the special inks can be

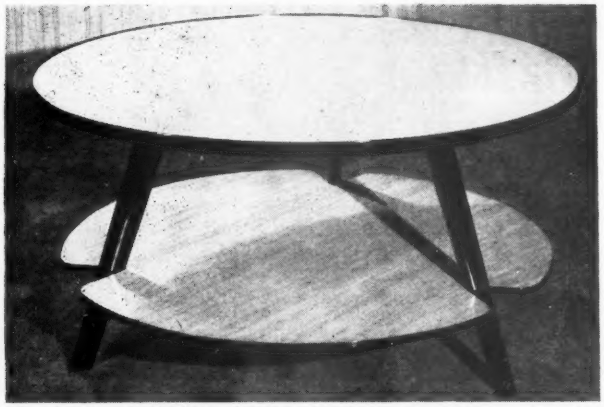


Fig. 6: (above): Table surfaced in plastic on plywood core. Legs in cellulosed cast aluminium. Designed by Norman James, M.S.I.A. Fig. 7: (right): Reception desk faced in plastic on plywood. Designed by W. M. Dixon, A.R.C.A.

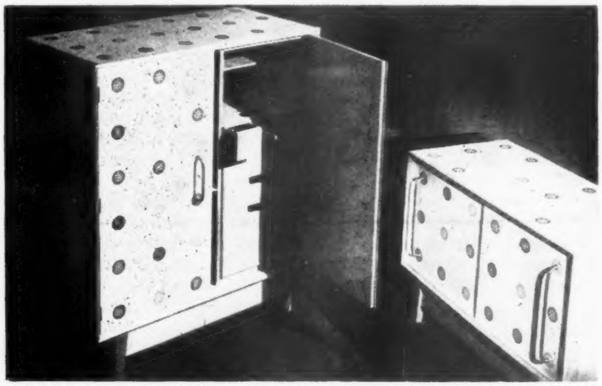


Fig. 8: Nursery wardrobe and cupboard. From the same suite as Fig. 9

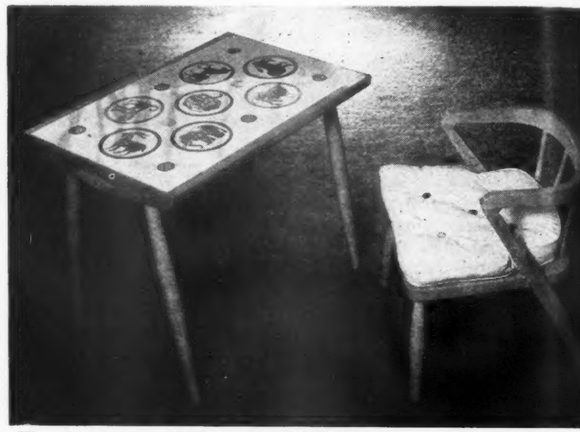


Fig. 9: Nursery table and chair, designed by Frank Austin and Neville Ward. Animal and star motifs designed by Enid Marx and printed by the silk-screen method

used, lead pencil and wax-less crayons being satisfactory. Indian ink is apt to 'bleed' slightly, though, in general, it can be used to good effect.

Paper and foil inlays can be very successful, though rather troublesome to prepare. This type of work has to be prepared at the works but this can be done provided the designer prepares an accurate template and full instructions. Here again previous contact with the manufacturers is essential to discuss the possibilities and limitations the designer must know. Obviously this technique can apply only for short runs. For long runs a printing medium would be more suitable and more economical, and for quantities of less than four figures this means screen-printing, which, as well as being the most satisfactory technically, is certainly the most economical method for runs of from two to four figures.

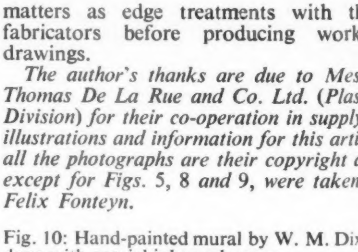
Letterpress printing is the best method for long runs of 'interlaminate-printed' notices and labels. This type of work is growing rapidly in scope and extent owing to the many advantages possessed by these products and their low cost and permanence. For engraving, a 'sandwich' material is used (*e.g.* black-white-black), the engraving tool penetrating to the core of the sandwich.

In all this class of work there are two golden rules. Keep the paper clean and ensure that the ink is thoroughly dried. These factors are not so easy as they sound. The slightest finger mark, unnoticed by the naked eye, can emerge from the press as smudging. Work prepared in a different part of the country from the manufacturer must not only be well dried before leaving the studio, but also again on arrival at the manufacturer to ensure that the moisture absorbed in transit is completely eliminated.

Conclusion. No mention has been made concerning the important subjects of workshop practice and adhesives as it is felt that this is not the right place to venture into controversial fields. As a direct result of the war there is available today a variety of adhesives, of resin or other base, suitable for cementing almost any one material to the same or almost any other material, and increasing use is being made of these adhesives in workshops generally. Different fabricators have their own likes and dislikes in practice in respect of adhesives and other technical matters; it is however recommended that designers who are new to these materials should discuss such matters as edge treatments with their fabricators before producing working drawings.

The author's thanks are due to Messrs. Thomas De La Rue and Co. Ltd. (*Plastics Division*) *for their co-operation in supplying illustrations and information for this article; all the photographs are their copyright and, except for Figs.* 5, 8 *and* 9, *were taken by Felix Fonteyn.*

Fig. 10: Hand-painted mural by W. M. Dixon, done with special inks and paper



Informal Conferences on Architectural Education

THE IDEA of regional informal conferences of teachers of architecture, which originated at Leicester, is being followed elsewhere. Below we print condensed reports of two such meetings, one at Manchester, reported by Mr. J. Brandon-Jones [*A*] and the other at the R.I.B.A. of teachers in the area of the South Eastern Society of Architects, reported by Mr. R. W. Paine [*A*].

Mr. Brandon-Jones [*A*] writes: 'Those who participate in conferences are only too often determined to press a particular line of propaganda rather than to discuss in a friendly spirit problems of common interest. There are any number of conferences organized by enthusiasts who intend to plug an idea, good or bad, to which they are completely committed before ever the talking starts, there are also conferences attended by parties of more or less equal strength each determined to make no concessions and to believe no word spoken by members from the other side of the table, and of course there are the "mutual admiration" conferences at which members congratulate themselves that they are not as other men!

The encouraging thing about the conference at Manchester in November was that its members came together prepared to give and to take mutual criticism. Discussion was frank, and hard knocks were taken in the spirit in which they were delivered. No one who attended the meetings could doubt that he was among friends brought together by a common desire to do their best for their students, and to that end prepared to adopt, or at least to discuss without prejudice, any proposals that gave a promise of improved results.

The idea of a meeting between the staffs of Midland and Northern Schools originated in Leicester and it was at the Leicester School that the first two conferences were held. This year the delegates assembled at Manchester and in future it is intended that the schools shall take turns as hosts. This system has the double advantage of giving all members a chance to visit neighbouring schools and of spreading the very considerable load of organization by the hosts.

It is desirable that a meeting of this kind should not be reported—the feeling that anything that you say may be taken down and used in evidence is a serious discouragement to extempore speaking and brisk argument. The organizers of the conference also feel that it is important that every member should have a chance to put in his word and for this reason the number of schools invited to send representatives has been strictly limited. This will be regretted by those who have not been able to attend, but their remedy is to arrange their own regional meetings.

The programmes of all schools of architecture have their common factors, but there are also differences arising from conditions of foundation and management, and it is especially interesting for those working under a local education authority to learn something of the administrative problems of a university school and vice versa. There are also differences in the facilities available for the study of special subjects—some schools are able to use the laboratories and call in the expert lecturers of an associated engineering department, while others have to make do with a small back room and a sink in the cupboard under the stairs. Manchester, for example, is lucky in having first class art collections near by and in being able to call upon the University Lecturer in Art. It is therefore not surprising that the school is able to provide a course of special lectures on topographical drawing backed up by visits to the art galleries, a fact that may have some bearing on the high standard of draughtsmanship in the school. Those less happily placed can not conjure lectures and early English water colours out of thin air, but having seen the work done at Manchester they may be encouraged to arrange for visiting lecturers and loan exhibitions which will to some extent fill the gap.

The Manchester School put all their cards on the table and a fine spread of drawings on the walls; the curriculum was described by the staff in charge of the various sections and comment was invited. To ensure that criticism should not be one sided the visitors had each brought a set of drawings and Manchester had the chance to hit back. The school, like most others, has had to provide for a sudden increase in numbers since the war and it is at present housed in several separate buildings—not one of which was designed for its present purpose. Two sections are close together and within walking distance from the central buildings of the University. The third section is in a large Victorian villa at Didsbury which is earmarked as a future University hostel. The less said about the architectural character the better and the arrangement has obvious administrative difficulties, but the surroundings are delightful and the grounds provide excellent opportunities for sketching trees from life! Very soon fresh accommodation is to be made available in which the whole school can be brought together.

It was almost frightening to discover the pace at which students had to work in order to keep in step with the regulations of the Faculty of Arts. In addition to their architectural studies all degree students must pass an "Intermediate" examination in a language other than English, and must take a special period of History of Art as a second subject. They are therefore required to attend University courses in these subjects as well as the normal courses in architecture. At the same time the terms are shorter than those of the average independent or municipal school—there are about 32 working weeks in the year including those devoted to examinations. In the first year the student studying for the degree may spend as many as 13 hours a week at lectures, at laboratory work and other classes, 13 hours that is, which are lost to studio design or construction. For diploma students the time devoted to lectures and so forth is about nine or ten hours weekly.

In the past the final term of fourth year has been spent outside the school gaining practical experience on a job or in an office, but this arrangement is at present in abeyance. Since the practice requirements of the R.I.B.A., when resumed, probably will require a substantial period of office work to be undertaken after the completion of the final examination, it is possible that the former fourth year arrangements will not be restored. A three-term fourth year will ease the strain in the upper years, but the Intermediate student will still be left with the present heavy load of studio work and lectures, which makes it difficult for him to take part in university activities outside the architectural school.

The problem of working out a time table covering the hundred and one things that an architect should know, and still leaving time for a reasonable social life, is common to all schools, but their degree syllabus forces the universities to face it in a more acute form than the schools of art. It was reassuring, however, to find that this important side of education in the wider sense had not been driven out of the minds of the staff in spite of the increasing number of technical studies that they are being asked to include in the curriculum.

Finally a word must be said about the Post-graduate work done for the degree of Ph.D. and M.A. or for the Diploma in Town Planning. This side of the work at Manchester was new and interesting to many of the visitors. In most cases the post-graduate student chooses an individual line of research, for the Doctorate or Master's Degree is an individual award and the Faculty will only accept joint work in exceptional circumstances. When joint work is allowed it is made a condition that the contribution of each member of the group should be clearly differentiated and complete in itself.

An example of the type of study undertaken by post-graduate students is the investigation of regional domestic architecture in Britain. Various areas have been covered by individual research students, each personally responsible for his own work in his own district. The main lines on which the studies are to be based have been decided in consultation with the professor and a standard system has been laid down for the collection and recording of statistics by means of card indexes and in the form of diagrammatic maps of the areas surveyed. The method of presentation gives an extraordinarily clear picture of the distribution of native forms of structure, and brings out very forcibly such things as the revolutions in technique that followed the economic ups and downs of agriculture and industry and the amazing results of the development of improved systems of transport. It was impossible in the short time available to grasp all the implications of this particular study, but many interesting facts are already emerging and it is certain that the data now being collected will be of great importance in confirming or demolishing a number of time honoured theories concerning the history of building in Britain.

The Manchester Conference passed no resolutions, called for no votes of confidence—and not one of the members walked out. From the journalists' point of view the most sensational thing about the meeting was that the members parted as friends!'

Mr. R. W. Paine [*A*], describing the South Eastern Society meeting, writes: 'The discussion was opened by Mr. F. E. Green, of Brighton, on the questions of *When Design Should be Introduced into an Architectural Course* and *To what Extent Teaching Should be Related to Traditional Work.* His view was that the cultivation of awareness of values and the acquisition of basic technique in drawing must come first and that design of buildings should not begin until after the second term. He stressed the point that the idea of design in general terms would be inherent in even the earliest work. Regarding traditional forms, he made the point that there exists today no clearly-defined code or language of design and that to hark back to work which had such a basis was necessary if the student was to acquire a standard of values. He suggested that this could probably best be done through the study of construction in the early stages and through the medium of history while design, involving reference to any idiom so refined as that of the Renaissance, might better wait until a fairly late stage when the student's sensibilities were sharpened. Mr. Brownrigg, of Guildford, and Mr. Bunce, of Hastings, both made a case for the design of building subjects at the outset since, in this way, the student's keenness was maintained and he became a willing party to the process of learning techniques for which he saw the necessity.

Mr. Brownrigg, of Guildford, next spoke on the subject of *Office Training and Practical Building Experience*. He saw only small advantage in the latter if it implied the acquisition of craft technique, although he stressed that the general understanding of processes was of value in dealing with work in progress. He approved the holding of well-conducted visits under supervision to building sites. Regarding office experience, he was a strong advocate of a break in the course to permit one whole year to be spent in an office so that a job might be followed right through. This, he argued, was preferable to the equivalent time made up of short snatches. Various speakers thought this method tended to extend an already lengthy course; there was also the possibility that students, once in offices, would be diverted from full-time training. Mr. Green spoke strongly in favour of concentration for five years upon the work in hand and the deferment of office work until the end of the course. Mr. Brown, of Kingston, on the other hand, maintained that a properly organized school training ought to and could include all that might be got from office work. He further suggested the division of students on the Swedish plan into those aspiring to be responsible architects and those who wished only to be draughtsmen and who might take a shorter training. Mr. Soden, of Rochester, urged the necessity of students getting to appreciate contract conditions which play a large part in determining choice of design approach. He advocated that all students should spend a day each week on a building site.

The next speaker, Mr. Goodchild, of Rochester, dealt with the problem of part-time students, particularly referring to the provincial school where numbers do not permit the organization possible in a Polytechnic. Added to this, part time students are widely various in kind of experience and are usually at many stages of progress. On the organizational side there is the difficulty of providing both staff and accommodation without overlapping. The problem is at its most acute in relation to design when a student can receive only limited individual attention and is generally cut off from the stimulation of working competitively in a group and from the stimulus of background activities. Mr. Poltock, of Rochester, spoke of the way the problem had been handled at Maidstone where association with the building courses of a technical college had offered a solution to the problem of how to provide specialist lectures for the few. Mr. Allen, of Rochester, said that a similar solution was to be found for lecture subjects by relegating those pertaining to the full-time course until the evening so that part-time students might benefit, but that this was a method not enjoyed by the full-timers who preferred day lectures.

Mr. Paine, of Canterbury, urged that the bulk of the work in the earliest period of training should be devoted to drawing and design and that sufficient time should be allowed to enable training in technique of drawing to run parallel to work in design for which the student is eager if inept.

Perhaps the most lively discussion revolved round the contribution made by the Principal of the Kingston School of Art, Mr. Reginald Brill, who spoke as a guest on *The Correlation of Architecture with the Work of a School of Art*. The layman he said, had to endure the work of the architect, who seemed increasingly to approximate more to the technician engineer than to the artist. Craftsmanship was dead and, although many flowers had been strewn upon its coffin with sighs for its demise, structure as an ideal had taken its place. In consequence, the tendency in training was to be concerned ever increasingly with technical studies as indeed the previous discussion had emphasized. He felt that if the creative urge was looked after and encouraged ways and means and the necessary enthusiasm would be found for the cultivation of technique. The school of art, he urged, in preference to the technical college, provided the ideal environment in which all were concerned with vital creative work. But even so the benefit could be enjoyed only if architecture left its splendid isolation and shed a little of its solemn preoccupation with lofty affairs to contribute to and share in the general hum of activity. Following speakers welcomed the idea in principle but suggested that not all schools of art were so happily conducted as Kingston. Mr. Brill said that the way to improvement lay with the staff themselves. Enlarging upon the idea of interdepartmental collaboration, he envisaged a state when the function of a principal might well become one of general business manager. Mr. Poltock suggested that a general prevocational art training common to all, including architects, might be a partial answer, but Mr. Brill rejected this as dangerously insufficient. He thought such training might be accounted enough and wanted rather to see a sharing of interests and a pooling of ideas at all stages and amongst staff and students alike. He disagreed violently with a suggestion by Mr. Paine that other departments of schools of art were today less lively and catholic in their interests and activities than a progressive school of architecture.

The last speaker was Mr. Paine, of Canterbury, who gave a brief summary of some ways of dealing with the problem of training students to understand materials and how to use them. He pointed out that however brilliant a design might be, its existence and endurance and much of its character depended upon the materials used in its construction. At the same time, to train students in this vital matter was, perhaps, the hardest task of all. He explained how week-end studies relevant to current design programmes, measured work which studied not merely form but material and its use, field surveys related to the teaching of construction, and the organization of summer camps for the detailed study of work strongly marked by the character of materials could all contribute. There was a strong case also for the encouragement of drawing techniques which helped the student to be aware of the nature in terms of materials of what he proposed, although that required intent supervision lest he become engrossed merely in pattern. Lastly, he stressed the need to face students with instances in use of the materials they

knew only from catalogues and to cause them to study work not only as finished but in various phases of its after life under the influence of weather, thermal change, site movement, etc. Mr. Addison enquired about laboratory work and to what extent this was considered necessary. Mr. Paine said he deemed this to be basically part of teaching along with construction, specification, etc., and had intended to show how what was, despite all this, still only theoretical might be made alive in terms of everyday occurrence and design value. He said that the use of the laboratory was to enable the student to understand the fundamental criteria which underlay the use of materials and the physical structure and properties of materials in detail which, together with other natural phenomena, caused the reactions which it was the business of field study to observe. To know that H_2O is water is to know nothing at all of water either as a menace or a pleasure or a visual part of design, while to know water in its everyday reality gives insufficient clue how to guard against its more insidious effects in building.

Practice Notes

Edited by Charles Woodward [*A*]

IN PARLIAMENT. **Building Licensing.** Asked what action he proposed to take in view of the Chancellor of the Exchequer's statement in this House on 26 October about a reduction in the exemption limit for building licensing, the Minister of Works replied: I have made an Order under Defence Regulation 56A reducing from £1,000 to £500 the amount which may be spent without licence on individual properties in the categories of industrial and agricultural building in the twelve months from 1 July 1949 to 30 June 1950; the corresponding amount for office buildings, storage buildings and educational buildings is reduced from £1,000 to £100. These new limits will take effect from 1 February next, so that work started under previous limit but costing more than the new limit will not require a licence if it is finished before 1 February; otherwise an application for a licence should be made in good time before that date. The Order makes no change in the £100 exemption limit for the remaining classes of building. (12 December 1949.)

Hardwood (De-control). Asked whether any further de-control of the hardwood trade is in prospect, the President of the Board of Trade replied: Yes, Sir. I am satisfied that the need for continuing to import hardwood on Government account has ended, and all hardwood will therefore revert to private trading on 16 January next. At the same time, price control of imported hardwoods will be removed. Details of the scheme for reversion to private buying have been worked out by my officials with a committee of the hardwood trade and will be announced shortly. It will, moreover, be possible, as part of the additional measures of import relaxation which I have just announced, to permit any private trader to import hardwood freely from a wide range of countries. (15 December 1949.)

Private Enterprise Building. Asked by virtue of what statutory obligation the maximum price of a house is revealed to the builder in the course of the issuing of a licence for a privately built house, the Minister of Health replied: The condition limiting the price must by virtue of the provisions of section 7 of the Building Materials and Housing Act, 1945, be stated on the licence and must be registered as a local land charge. (15 December 1949.)

Planning Permission (Applications). Asked what steps he took to satisfy himself that no undue waste of time or money arose from the scrutiny of applications for planning permission submitted by persons having no interest in the land such as to enable them to carry out the development, even if permission were granted; and that the grant or refusal of planning permission in such cases did not prejudice the subsequent applications of persons having such an interest, the Minister of Town and Country Planning replied: I have no evidence of undue waste of time or money as a result of the scrutiny of irresponsible applications for planning permission. On the question of prejudice the grant of permission is not related to the applicant, but to the type of development proposed, and the decision, once given, is likely to be maintained if the development proposed is identical. (16 December 1949.)

MINISTRY OF WORKS. Standard Metal Windows. The British Metal Window Manufacturers' Association Ltd., in agreement with the Ministry of Works, has issued a revised price schedule for standard metal windows made in accordance with B.S.990. The new prices leave the average level of prices generally unchanged, but prices of individual windows have been revised, some upwards and some downwards. The prices apply to all quotations submitted on and after 5 December 1949. (MOW/148/49. P.1.73, dated 7.12.49.)

Use of Timber. The Ministry has issued a new Economy Memorandum, 'Use of Timber in all Building Work', which replaces Memorandum P.1.80, first published in February 1947. The Memorandum is Timber No. 2, and is obtainable at H.M. Stationery Office, price 6*d*. It includes details of the restrictions imposed on the use of softwood in a number of building operations, and of the maximum sizes in which timber is to be used for joists, rafters, purlins and floor-boards. (MOW/149/49. P.1.80, dated 6.12.49.)

Advisory Leaflets. The Ministry has published Advisory Leaflet No. 4, 1949, which deals with Cavity Party Wall Construction for Sound Insulation. Application for copies should be made to the Ministry at Lambeth Bridge House, Albert Embankment, London, S.E.1.

Building Licensing. The Control of Building Operations (No. 14) Order, 1949, No. 2278, has now been issued and comes into operation on 1 February 1950. The effect of this Order is as stated by the Minister on 12 December and quoted in these Notes under 'In Parliament'. The Order can be obtained at H.M. Stationery Office. Price 1*d*.

Building Licensing. Registered Application for a Supplementary Licence. In the Ministry's pamphlet giving guidance to applications for building licences which was revised in September 1948, paragraph 17 omitted the previous provision that if a registered application for a Supplementary licence was made the work could be continued unless and until the applicant heard to the contrary. This omission was referred to when the revised edition was epitomised in Practice Notes, JOURNAL, March 1949.

The reason for the omission is because in the case of Jackson, Stansfield and Sons *v*. Butterworth the Court of Appeal decided that only a written licence was valid, with the natural corollary that any work for which there was no written licence was illegal. When the case was argued in the High Court in July 1948 paragraph 17 of the Ministry's pamphlet was mentioned, and it was obvious that the court considered the provision regarding the registered letter to be objectionable. The Ministry, therefore, removed this provision in the revised edition so that people should not be misled into thinking work was legal when it was not.

If additional work is to be done or the original cost is to be exceeded a supplementary licence must be obtained before the work is carried out. The case of Jackson, Stansfield and Sons *v*. Butterworth was quoted in Practice Notes, JOURNAL, September 1948.

MINISTRY OF TOWN AND COUNTRY PLANNING. The Minister has now made Regulations in connection with claims for payment in respect of interest in certain war-damaged lands which are depreciated in value by reason of the provisions of the 1947 Town Planning Act. The claims are to be made to the Central Land Board, and the Board will issue an explanatory leaflet giving guidance on who should claim and how claims can be made, and examples of how assessments and payments work out in practice. The Regulations are made under section 59 of the 1947 Act. (S.I.1949 No. 2255. Town and Country Planning, Central Land Board, The Planning Payments (War Damage) Regulations, 1949, price 2*d*., obtainable at H.M. Stationery Office.)

The Treasury have now made the scheme referred to in section 59 of the 1947 Act, which came into operation on 12 December

1949. (Planning Payments (War Damage) Scheme, 1949, S.1.1949, No. 2243.) The scheme authorizes additional payments in respect of interests in war-damaged land in certain cases where the appropriate payment under the War Damage Act, 1943, was a value payment. The value payment represented the difference between the before-damage and after-damage value of the land. The cases covered by the scheme are, broadly speaking, those in which the after-damage value was increased (and the value payment therefore reduced—sometimes to nothing) because there was in the damaged site development value which the Act of 1947 now prevents the owner from realizing. The scheme is obtainable at H.M. Stationery Office.

The Ministry have issued an Explanatory Memorandum on the Town and Country Planning (Control of Advertisements) Regulations, 1948. It is obtainable at H.M. Stationery Office, price 3*d*. net.

The Town and Country Planning (General Development) Amendment (No. 2) Order, 1949, No. 2306, extends from eighteen months to thirty months the period allowed to local planning authorities for consideration of applications for planning permission in respect of mining operations which, under paragraph 1 of Class XIX of the First Schedule to the Town and Country Planning (General Development) Order, 1948, are permitted until those applications are dealt with. The new Order came into force on 31 December 1949. Circular No. 78, dated 15 December 1949, issued by the Ministry, explains the reason for the new Order.

MINISTRY OF EDUCATION. The Minister has made Amending Regulations in connection with school premises so that savings may be made in the cost of building by modifying existing Regulations dealing with ancillary accommodation. (S.1.1949. No. 2279, Education, England and Wales, The School Premises Amending Regulations, 1949, price 1*d*. net., obtainable at H.M. Stationery Office.)

Circular 212, dated 13 December 1949, issued by the Ministry, deals with the Amendment of Building Regulations, S.R. & O. 1945, No. 345. The object of the circular is to lower costs, to make the Regulations more flexible and to remove anomalies.

MINISTRY OF HEALTH. Circular 100/49, dated 11 November 1949, addressed to Housing Authorities and County Councils in England, refers to the new Economy Memorandum, 'Use of Timber in all Building Work', issued by the Ministry of Works. In the appendices to the Circular recommendations are made in regard to the use of softwood and the situations in which it should not be used. These include roof boarding under slates or tiles, fascia boards, eaves soffits, window boards and reveals, draining boards, wall plates for first floor joists, tank casing and fencing.

First floor joists, ceiling joists and rafters should be 1½ in. sizes instead of 2 in., ridges ¾ in. by 5 in. instead of 1 in. by 6 in., hips 1 in. by 7 in. instead of 1½ in. by 6 in., tiling battens under 18 in. centres ¾ in. by 1 in., and 18 in. centres and over 1 in. by 1 in. Flooring should be ¾ in. and ⅞ in. nominal instead of 1 in. nominal.

Roof pitches should be 40 degrees for plain tiles and 35 degrees for interlocking single lap tiles.

It is estimated under the Economy Memorandum that in the present-day house of 1,032 ft. sup., including outhouse and covered way and a roof pitch of 40 degrees, the following quantities of softwood would be required: Roof 75.90 cu. ft., first floor 79.53 cu. ft., joinery 92.65 cu. ft. This equals 1.503 standard.

The increased use of hardwood for doors, cupboards and fitments *in new houses erected under licence* is recommended and it is added that the additional cost should be included in the value of work licensed and therefore reflected in the maximum selling price fixed as a condition of the licence. Consideration can no longer be given to the use of softwood boards on solid ground floors except for bedrooms in bungalows and on the ground floors of blocks of flats.

Where metal windows, metal door frames, pitched steel roof construction, hardwood, plywood or steel for fitted cupboards and dressers, and flush doors internally instead of panel doors are used, it is estimated that the amount of softwood not required would be 0.70 standard. If a pitched roof of 35 degrees with interlocking tiles, asbestos cement slates or natural slates (8 in. and wider) is used the saving in softwood is estimated to be 0.13 standard. If roof purlins are strutted from load-bearing partitions on the upper floor the saving in softwood would be 0.04 standard. (See Economy Memorandum, paragraph 5 (*a*) (iii)).

Circular L.R.L. 10/49, dated 31 December 1949, refers to building licences and war damage repair work costing more than £250. An agreement has now been reached with the War Damage Commission that instead of actually issuing a building licence, local authorities should send a letter to the applicant indicating their readiness to issue a licence when the Commission's approval of the work has been obtained. The Commission have agreed that their Regional Offices would accept such a letter and proceed with the examination of the claim. The Circular states that it is understood that a number of local authorities are not operating this procedure and their full co-operation is requested. The Circular is addressed to the London County Council, the Common Council of the City of London, Metropolitan Borough Councils, other Housing Authorities and other County Councils in the London Region.

NEW ACTS OF PARLIAMENT. The following Acts received the Royal Assent on 16 December 1949: The War Damaged Sites Act, 1949, The National Parks and Access to the Countryside Act, 1949, Parliament Square (Improvements) Act, 1949.

THE LANDS TRIBUNAL ACT, 1949. The Rules governing the procedure of the Lands Tribunal are set out in S.1.1949, No. 2263 (L.29) having effect from 1 January 1950. The Rules are obtainable at H.M. Stationery Office.

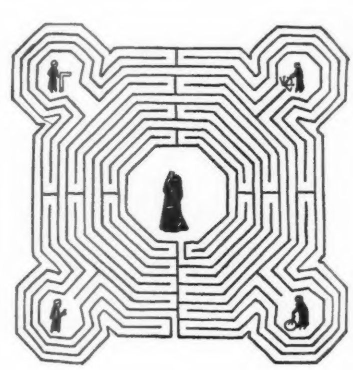
Correspondence

ARCHITECTS IN A MOSAIC MAZE

Sir,—Would you be so very kind as to give some information about the maze which appears on page 48 of the December JOURNAL? Perhaps you could indicate its source. Is it medieval, and is the central figure headless?

Yours sincerely,
D. E. Harding [*A*]

Editor's Note. The drawing is from *Architekturens Historie* by Vilhelm Wanscher and is one of several which, with the permission of the author, we have selected for JOURNAL tail pieces. The description in the book is in Danish and medieval French, but the R.I.B.A. Librarian and his staff have extracted the following information about the maze. It was portrayed in a floor mosaic in the nave of Rheims cathedral. It is now destroyed, but a description of it was published in the year 1779 by Cocquault when some of the inscriptions (not shown in the drawing) were still legible. These inscriptions showed that the four corner figures were of four architects or masters of works of Rheims cathedral, namely: (Right bottom) Jean d'Orbais, 1211–1240. (Left bottom) Jean le Loup, 1240–1256. (Left top) Gaucher de Reims, 1256–1264. (Right top) Bernard de Soissons 1264–1299. It is not clear what the central figure portrayed; it is not headless, but appears either to have its arms raised or to be wearing some kind of lop-sided headdress. The date of the mosaic is unknown, but there is a similar one in Amiens Cathedral dated 1288.



The Building Exhibition Olympia, 1949 Part 2

Fig. 1: Messrs. Pilkington's stand

School Construction. The Thermagard system of construction for school buildings was shown on the stand of Thermacoust Ltd. It consists of a light steel frame construction infilled so far as the roofs (pitched or flat) are concerned with Thermacoust wood wool slabs which provide thermal insulation and span between bearers to carry bituminous sheeting or, on appropriate pitches, tiles or slates. The system was originally designed to an 8 ft. 3 in. grid as recommended by the Technical Working Party on Schools Construction. This proved to give an uneconomical spacing for stanchions and roof beams and, in consultation with the Ministry of Education, Messrs. Thermacoust and their steelwork fabricators, Messrs. Gardiner, Sons, & Co., Ltd., have redesigned it to a 3 ft. 4 in. module. The redesigned system is called Mark II, is economical of steel and has already been adopted for a school at Cardiff. A wide range of unit spans and heights is obtainable to suit the various parts of a school building. The wood wool slabs are channel reinforced and, according to thickness and purpose, span from 6 ft. to 7 ft. The thermal insulation is good: the roof constructions have a U-value of 0.16 to 0.18 which is less than half that of traditional roof construction and the wall (4½ in. brickwork, cavity and 2 in. wood wool plastered) has a U-value of 0.165 which compares very favourably with a solid 13½ in. wall at 0.35.

Materials. The problem of choosing a satisfactory floor covering is not an easy one in these complex days, when it has to be non-slip, acid proof, grease proof, pleasant to the tread, non-dusting, and a few other things. The research department of the Dunlop Rubber Co. have been continuing their investigations into this question, and as a result Messrs. Semtex, Ltd. —a company in the Dunlop Group—have been able to produce a new and improved Semastic Decorative Tile which is richer in colour, more resistant to wear, easier to install and maintain, and pleasant to the feet. The richer colours are due to the development of light resins, and four plain and 10 marbled patterns are available. The makers claim for these improved tiles that they are resistant to severe abrasion and impact, that they are not affected by normal spilling of fats, oils, greases, acids, alkalis and common solvents; that they do not support combustion, and are not affected by moisture.

The tiles are made in a standard size 9 in. by 9 in., and can be had in standard or heavy gauge; they can also be shaped to curves for covings.

The stand of Pilkington Brothers Ltd. (Fig. 1) seemed to show every structural and decorative use of glass except ordinary sheet, which one takes for granted. A pair of Armourplate glass doors was flanked with two large single sheet panels of ¾ in. rough cast plate glass; a double glazed window looked out upon a painted Alpine vista; prismatic glass demonstrated its refractive powers; hollow glass block walls made a sound-resisting room; Vitrolite and mirrors lined a model bathroom; and there were glass domes, pavement lights, patent roof glazing, glass tiles and a variety of painted, fired and toughened glasses for structural and decorative uses. The stand was designed by Mr. S. M. Sternfeldt [*L*].

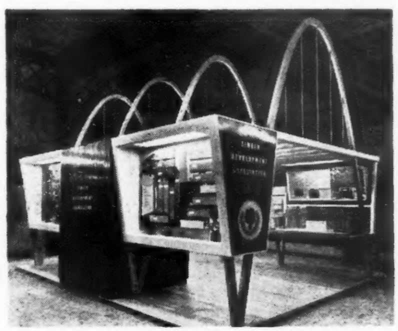


Fig. 2: The T.D.A. stand

An interesting stand on which architects crowded was that of the Timber Development Association (Fig. 2). This was probably because a few selected features in an enormous field of material and utilization of material were displayed imaginatively. The frame of the stand consisted of four parabolic glued laminated arches of Douglas fir only 2½ in. by 4 in. thick and built up of ⅜ in. laminates. Below the arches were ¾ in. thick hangers of Rauli, a Chilean hardwood. That African hardwoods (non-dollar) are now becoming readily available was shown by the use of mansonia, a West African hardwood, for the vee-jointed boarding of the enquiry space and of African mahogany for the cupboard doors. The tops of the tables on which models of up-to-date timber constructions were displayed, were of sycamore veneer with mansonia edging. The architect was Mr. R. T. Walters [*A*].

Messrs. James Clark and Eaton, Ltd., have solved a little difficulty in connection with the hollow glass blocks which are being much used now, that is, the lack of ventilation, especially when the blocks are made up into a large panel. The 'Ventiblock' has two air passages, and the 'floors' of the passages are humped in the centre to stop direct draughts without unduly checking the air flow; this arrangement also keeps out rain and prevents anyone from seeing right through. The units measure 7¾ in. by 7¾ in. so they course in with the usual glass block of that size. The patented design provides for an opening and closing device, which is now being developed. It should be a useful unit for several positions, and the larder window is one that springs to the mind at once (Fig. 3).

Another ventilator is the Johnson Louvre, patented by Messrs. G. Johnson Bros., Ltd., of Cornwall Road, London, N.15. This is a louvre-type window with one or two special advantages. First, the angle of the louvres is altered by means of a milled knob on the inside, so that—short of smashing the bottom louvre to get at the knob—the setting can not be altered from the outside. The second point is that on each side there is a moulded metal weather-strip attached to the external ends of the metal louvre-holders, and when the window is closed this strip fits into a rebate provided for it, and so prevents rain from driving in. As the louvres can be opened to a horizontal position it is possible to set the window to give anything from 0 per cent to 100 per cent uninterrupted airway. Remote control can be fitted in cases where the window is fixed high up. The window can be obtained in mild steel, bronze, aluminium, or stainless steel, and the louvres can be in metal instead of glass, if ventilation only is needed. Heights range from 1 ft. 7⅝ in. with three louvres to 6 ft. 4½ in. with 13 louvres. The glass louvres are 7½ in. wide by $\frac{3}{16}$ in. thick, and are suitable for any opening up to 3 ft. wide.

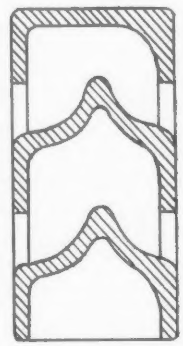


Fig. 3: Ventiblock

Surface finishes. The dramatic helical sweep of tiled surface on the stand of Carter and Co., Ltd. (Fig. 4) demonstrated that tiling need not be confined to solid wall buildings and that quite large tiles

can be used on curved surfaces. After the visitor had admired this engaging piece of construction, it dawned on him that all the tiles shown on it were of one colour but of an astonishing range of texture. Eggshell and glossy glazes were shown on ordinary plain, morocco-faced low relief, corded surface, ribbed, grooved, pinhead, cushioned and coffered wall tiles, floor tiles and mosaics—and all buff coloured. When one realizes that these textures can be repeated in an enormous range of colours, one begins to envisage dimly the decorative possibilities of tiles.

Equipment. All architects are agreed that the number of commercial light fittings which they can even bear to glance at, much less install in buildings they take a pride in, are very, very few in number. The Merchant Adventurers, Ltd., of 48 Portland Road, London, W.11, showed on their well-designed stand a collection of fittings that were the exact opposite in being almost all taking to the eye. Every fitting had a purely functional basis, in being designed for a specific and carefully studied job of illumination, but to this was added a feeling for form and materials which is very rarely found in this important field of equipment. We illustrate two examples. Fig. 5 shows a desk lamp which is fitted with an internal glass bowl on which the shade rests, giving direct and indirect illumination. The shade is of spun aluminium, anodized or colour sprayed, or can be in fabric. The stem is of turned hardwood and the metal base is weighted. Fig. 6 shows a desk or drawing board lamp with a flexible tube, clamp and spun aluminium reflector. The clamp can be fixed anywhere along the edge of a desk or board and a push adjusts the light to exactly the desired position, where it stays put. Many of the fittings are designed by Paul Boissevain, M.S.I.A., who with Miss Barbara Osmond [*A*] designed the stand.

There are several ways of securing the glass sheets in what is known as patent glazing, each having its own particular merits, but the Northern Aluminium Co., Ltd., showed a method which seemed to do its job in as simple and efficient a manner as any. The aluminium glazing bar is made to a simple shape rather like that of the rails used in railways, and has the usual condensation channel with a cushion cord on which the glass rests. The glass is kept in place by a single aluminium capping strip which sits over the top flange and is secured by bolts passing through the web of the bar, so that as the bolts are tightened the capping is drawn in and fits more closely to the glass. The company do not sell complete glazing bar assemblies, but produce only the extruded sections and the sheet or strip from which the cover strips are formed; the specialist patent glazing firms will do the rest.

The gas specialist firms have provided us with appliances that will deliver hot, or boiling, water as desired, and now there is an electrical unit that will do the same thing; the 3 kW type is known as the 'Hotentot', and the 4 kW as the 'Hotway'. The Campbell Engineering Co., Ltd., who make them, were awarded the 1948 gold

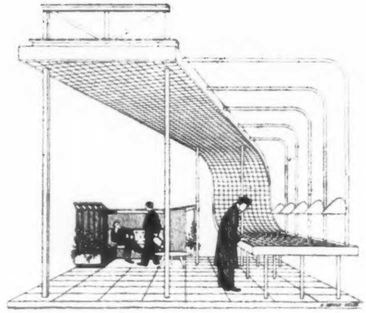


Fig. 4: Messrs. Carter's stand

medal of the Society of Inventors for the best invention of the year. The unit has a cylindrical cream stove-enamelled outer casing, with a bakelite cover which can be rotated and is really a rotary switch. The heater is of the non-storage type and current is used only when water is running. The essential part of the idea lies in the two U-shaped tungum tubes in which the heating elements are placed; these tubes are also the waterways, so the water is rapidly heated as it passes over the elements. Rotation of the bakelite cover makes the necessary electrical contacts and also depresses the water-controlling valve, allowing the water to circulate through the tubes. An automatic cut-out switch comes into operation if the water supply should fail. The 3 kW type will give 1 pint of boiling water every 75 seconds, or 1 gallon of hot water (130 degrees to 140 degrees F.) every five minutes; the corresponding times for the 4 kW type being 48 seconds and three minutes. Both types are $4\frac{1}{2}$ in. diameter, and are 17 in. and 19 in. high respectively.

In the design of radiators other than the hot water type it may fairly be said that manufacturers have quickly got away from the idea of housing a new method in the casing of an old one, and the gas and electric space heaters on exhibit combined a good deal of elegance with efficiency. Our old friend the Luma gas heater was well to the fore in this respect, and the Harper gas radiator was another good one; indeed, the design was one of those chosen by the Council of Industrial Design for the 'Britain Can Make It' exhibition. The Harper heater is of the convection type, and has an internal baffle which keeps the outer case cool and throws the heat forward and upward; the heater can therefore be placed against a wall with less anxiety than usual regarding discoloration of the adjacent decorations. The heater is made by J. Harper and Co., Ltd., of Albion Works, Willenhall, Staffs.

Oil-fuel heaters, too, have got far away from the old-fashioned circular form and, it is claimed, from that peculiar and characteristic smell that came from it; now, one has to look twice at a heater to see what type of fuel is being used. The Interoven Stove Co.'s 'Ottest' oil heaters are fitted with a patent burner which vaporizes paraffin oil, giving a very hot flame and no dangerous by-products or fumes, and the makers state that they extinguish

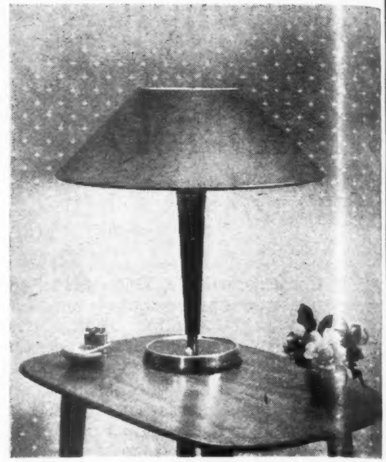


Fig. 5: Merchant Adventurers' desk lamp

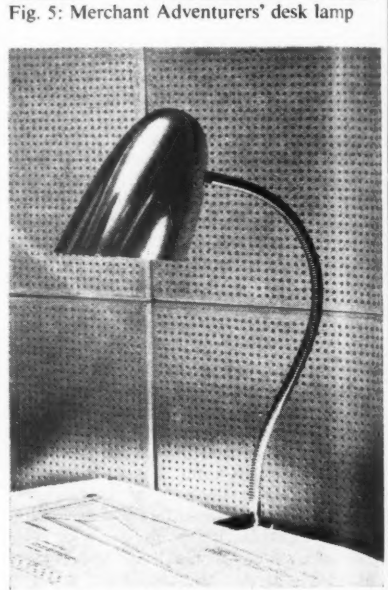


Fig. 6: Merchant Adventurers' drawing board lamp

themselves if knocked over or dropped, but they do not say what would happen if the price of oil were to fall.

The well-known Greenwood anti-vak trap was on exhibition, but it is now called the Grevak trap. The number of buildings in which it has been installed show that its anti-syphonage properties are well recognized. On the subject of traps, it would be a convenience if the cross-bars of all outlets to basins, sinks, and so on, were to be in a separate tube screwing into the normal outlet piece, so that it could be removed for clearing the underside of the cross-bars, as it is not easy to do so from the top. Access eyes to traps are usually rather small; Messrs. Benham and Sons make a trap that has an access eye on each side, which is a convenience in awkward positions, especially where a bath has a rather small access opening in the enclosing panel.

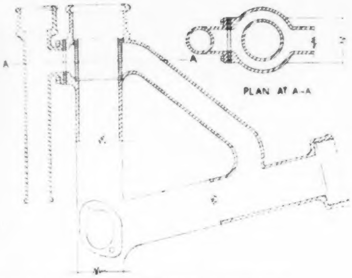


Fig. 7: The Spruce-Thrower soil unit

giving little room to get at any of the plumbing.

A fitting which makes a much needed simplification in soil drainage is the 'Spruce-Thrower' soil unit, developed by B. Finch and Co., Ltd., of Belvedere Works, Barkingside, Essex. It combines in a single neat and workmanlike cast-iron fitting that customary mess of pipes and joints where W.C.'s are joined to a soil stack and anti-syphonage stack (Fig. 7). The illustration explains itself, though the way in which the anti-syphon branch by-passes the soil stack by means of an annular passage cast in the fitting should be noted. The unit is specially designed for use in multi-storey buildings with superimposed lavatories and where the pan is jointed direct into the unit. It can be used equally well where soil pipes are on external walls or in ducts as well as with either one-pipe or two-pipe systems.

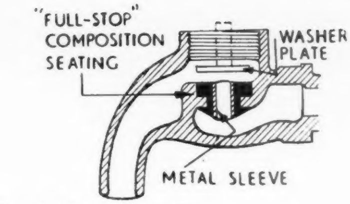


Fig. 8: The full-stop tap

Gadgets. Although for some reason difficult to explain a leaking tap is a sad and depressing sight, changing the washer is an operation the average person is liable to put off, even if he knows where the controlling valve is and assuming there is one; so anything that does away with leaking deserves attention. The 'Full-stop' tap does not claim to be everlasting, but it has been put through accelerated tests equivalent to over 20 years normal wear without showing any appreciable signs of deterioration. Fixed in the body of the tap is a hard rubber composition seating in which there is a metal sleeve to prevent distortion, and turning the capstan handle brings a metal disc down to the top surface of the composition seating, thus stopping the flow. This disc is slightly less in diameter than the seating so that it does not come into contact with the body of the tap, which might become uneven through wear. The seating is just sufficiently elastic to give a 'soft' shut-off, and it can be replaced without difficulty, if it should become necessary to change it after a number of years. There is another form of 'Full-stop' seating that can be put into existing taps. The makers are F. H. Evans and Co., 138 Plashet Road, London, E.13. The tap has been accepted by the Metropolitan Water Board (Fig. 8).

Another tap on exhibition was the Global tap, made by Messrs. Hyspecon, Ltd., of 6 Stanley Park Road, Wallington, Surrey. This tap has indeed a 'new look', as its body is global; the upper hemisphere has a ribbed 'equator' to give a grip for rotation when turning the water on or off, which needs only a half turn. Owing to the special construction the washer can be changed without turning off the supply at the stopcock, and in what corresponds to the Arctic Circle is a plate which on removal discloses a small spanner and some spare washers.

How often the little everyday things are taken for granted, and no one thinks of altering them; take, for example, the ordinary hinge for the ordinary door, which requires the door and frame to be rebated for a close fit. The Hurlinge hinge does not need any rebating, because one leaf fits into a recess cut out of the other, so when the door is shut there is only one thickness of metal instead of the usual two. The arrangement of the pin and its barrel is such that projecting lugs ensure correct alignment of the door. Incidentally, this hinge saves a certain amount of metal. It is marketed by Messrs. Eastwoods Sales, Ltd., of Eastwood House, 158 City Road, London, E.C.1.

Review of Construction and Materials

This section gives technical and general information. The following bodies deal with specialized branches of research and will willingly answer inquiries.

The Director, The Building Research Station, Garston, near Watford, Herts. Telephone: Garston 2246.

The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone: Princes Risborough 101.

The Director, The British Standards Institution, 28 *Victoria Street, Westminster, S.W.*1. *Telephone: Abbey* 3333.

The Director, The Building Centre, 9 *Conduit Street, W.*1. *Telephone: Mayfair* 8641-46.

The Director, The Scottish Building Centre, 425-7 *Sauchiehall Street, Glasgow, C.*2. *Telephone: Douglas* 0372.

Domestic Fuel Policy. In November 1948 the Ministry of Health issued their circular 170/48, which went to all housing authorities and county councils in England. It contained a list of recommended solid fuel appliances suitable for housing schemes. Since then the D.S.I.R. and the Ministry of Fuel and Power have tested and approved a further selection of appliances, and these are listed in Supplement No. 1 to Circular 170/48, and the two documents should be read in conjunction with each other.

The supplement mentions 53 types, and divides them into categories; openable stoves, continuous burning; open fires, continuous burning; open fires, not continuous burning; cookers, continuous burning with boilers; and independent boilers. The manufacturers' names are given, and a column contains remarks on suitable fuels, while another column gives other remarks, such as, 'continuous burning when fitted with closure plate.'

Aids to quicker building. In the last year or two building exhibitions have shown many mechanical aids for hoisting components on building sites, so that the labourer need no longer climb a ladder with a hod of bricks on his shoulder. The Ministry of Works have been trying out some of these appliances at their field test unit, and at the same time their observers have kept records on building sites where manual methods only were being used. Mr. J. F. Eden has reviewed these recent developments and points the moral that the problem of hoisting bricks and mortar on a housing site must be considered in relation to the site as a whole, and that very mobile equipment is needed to enable it to be moved quickly from pair to pair of houses.

The cost of these mechanical aids is not inconsiderable, and naturally the builder must consider the period in which he expects to see a return on his capital outlay, bearing in mind the amount of work in prospect, but the records taken show that the estimated costs of mechanical handling by the methods available compare favourably with typical present-day costs of manual handling. At present we raise bricks from the ground to the scaffold where they are wanted; it may be—who knows—that in years to come they will be lowered from helicopters radio-controlled from a central station on the site.

British Standards. B.S.648:1949, Schedule of weights of building materials, is intended to standardize the data employed in calculations rather than to provide more exact data for this purpose. The weights scheduled are a fair average value, and may be regarded as sufficiently accurate for general purposes in calculating dead loads in building work. Price 3s. post free.

B.S.1572:1949, Colours for flat finishes for wall decoration, replaces B.S.381 WD: 1945. The new Standard illustrates 15 standard colours, and specimens of each approximately 6 in. by 4 in. may be obtained from the British Standards Institution, price 1s. each or 10s. for the set. The Standard itself is 2s. post free.

Review of Films—15

The country of origin and date of release are given first. The film is in monochrome unless otherwise stated. The sizes (35 mm. and 16 mm.) are given. Sound films are marked 'sd', and silent 'st.' The running time is given in minutes.
(F) indicates free distribution.
(H) indicates that a hiring fee is payable.

Cathedral City
Britain 1949
Summary. The film traces the origin of Canterbury Cathedral and the city from the original foundation of the abbey to the present day. There are some views of the Norman crypt, St. Augustine's chair, the cloisters, the choir school, etc., and some shots of the cathedral precincts and Pilgrims' Way.
Appraisal. A magnificent subject deplorably treated. The theme of the film needed much more careful planning and greater interest could have been aroused by showing more shots of the city itself. The photography required more skilful handling—many similar views were repeated throughout the film producing an effect of monotony. Some shots were held for too long, and the commentary was pedestrian and boring. In the copy seen the sound track was poor.
16 sd. 19 minutes. Gaumont British Equipments, Ltd., Aintree Road, Perivale, Greenford, Middlesex.

Country Homes
Britain 1947
Summary. The countryside has special housing problems: many picturesque cottages provide only extremely poor living conditions. The Airey house was specially designed to meet the needs of rural areas: most of the component parts are factory made, and much of the work is carried out by unskilled labour. The first experimental house was subject to severe tests before the design was finalized. The film states that the actual erection of a house can be done by two skilled and four unskilled workmen in a fortnight: it is proposed to erect 20,000 of such houses.
Appraisal. This is a frankly commercial but a competent film in which the facts are told in a clear and concise manner: the photography is of a good quality and the commentary straightforward and generally interesting. Although the film would be of little interest to technical audiences on account of its limited approach it would have useful propaganda value for Rural Councils and other bodies likely to purchase Airey houses. It should interest general audiences.
35 sd. 11 minutes. Central Film Library, Imperial Institute, S.W.7.
16 sd. (Ref. No. UK. 870.)

Book Reviews

The Conscious Stone. The Life of Edward William Godwin, by *Dudley Harbron.* 8½ in. xviii + 190 pp. + 8 pls. text illus. Latimer House. 1949. 12*s.* 6*d.*
The appearance of an architectural biography is an event of some consequence, offering a momentary magnification of the historic scene. The quality of the subject of this work is undoubted, yet the initial interest is not altogether sustained, for, as the sub-title of the book clearly states, Mr. Dudley Harbron is more concerned with the life of Edward Godwin than with his many and varied achievements. The documentation seems small. A brief chronological list of works projected and undertaken would be of much value, though more important than this is the insufficiency of illustrations.

Strong claims are made on Godwin's behalf, and yet the reader is denied the opportunities of forming some opinion either by means of photographs or contemporary drawings. For additional information I was glad to refer to the ARCHITECTURAL REVIEW for August 1945, 'Edward Godwin', and for July 1943, 'Queen Anne taste and æstheticism'.

In spite of these limitations, the introduction of another figure from the turmoil of the latter part of the 19th century (who is bound to be claimed as an even earlier 'modern') is very welcome, for in this instance the independence of mind and work is unquestionable, while the effect of Godwin's ideas upon the theatre and upon interior decoration of the smaller scale has been lasting if little recognized.

An early interest in the mediæval, as seen in and around Bristol, in costume, the theatre, and the works of Shakespeare, an engineer's training under William Armstrong, and later a close friendship with William Burgess, are all influences from which unusual results may be expected. Beginning with warehouses and town halls won in competition, Godwin's singularity soon became noticed. Thereafter his designs for buildings became interspersed with work on furniture and interiors in general, finally culminating in the famous White House, Chelsea.

Through Godwin's early association with Ellen Terry and his novel interiors he became one of the rallying points for the theatrical and 'Æsthetic' elements. Sir Max Beerbohm, Oscar Wilde, Eastlake, Johnston Forbes-Robertson, Rossetti and especially James M'Neill Whistler were but a few of the leading figures that surrounded him and who diverted his energies towards the theatre. It was here that he found his greatest scope and response, and on which he wrought lasting changes; accuracy of period in costume and setting was his chief concern. The 'Queen Anne Style', which is claimed to have been largely determined by Godwin, the interest in Japanese art, architectural education and the competition system of the day, 'Dress in relation to health and climate' were additional activities which owed much to his enthusiasm and drive.

The consequent difficulties of achieving a balance between the many parallel activities in this biography are considerable, but the record of an architect's achievement is as much a matter of design as of accuracy of fact. So diverse a figure surely merits second thoughts and a more substantial monument. PATRICK HORSBRUGH [*A*]

Heavenly Mansions and other essays on architecture, by *John Summerson.* 8½ in. ix + 253 pp. + pls. text illus. Cresset Press. 1949. £1 1*s.*
For reasons outside my control I have in the past ten years had to do most of my reading—octavos and quartos alike—in buses, tubes and trains, and I can speak with authority, therefore, if I insist that one of the highest compliments one can pay to Mr. Summerson's book of essays is to say that it can be read comfortably in a bus—comfortably as far as format and unstainable (if far from undamageable) binding go, and comfortably also as far as contents are concerned. Dr. Johnson spoke of clubable men; what constitutes a busable book? I am not thinking of fiction here; a scholar's book to be busable must be well written to carry one over eye-strain, and stimulating all through to carry one over breaks between journeys. Both qualities are present to the highest degree in *Heavenly Mansions* just as they were in *Georgian London.*

The papers assembled in *Heavenly Mansions* range from the celebrated ædicule to the Mischievous Analogy, from Butterfield to Le Corbusier, from the visions of the *Hypnerotomachia* to those of Gandy. In spite of this variety certain motifs recur through the book often enough to give one the happy confidence of being led along according to plan. Thus, for instance, the motif of ruins comes into Leone Battista Alberti, Gandy and an eminently sensible discussion of the future of the city churches of London.

Another motif or rather attitude appearing throughout is that which is formulated most succinctly on page 52: 'There should be no question of pedestals'. Mr. Summerson—those who have met him at debates or question time know—likes to shock and perhaps to debunk. So Alberti is called 'utterly heartless', the never-ceasing blank arcades of the Anglo-Norman style are 'maddening' (and so they are), Wren never succeeded in co-ordinating intellect and imagination, the language of the modern buildings of about 1930 in England is 'ugly and trite', and so on. Such statements will irritate some readers, while they should in truth merely stimulate.

Besides, they are only an occasional punctuation between pages of solid achievement, for instance a good deal of new factual evidence on John Wood of Bath, the best most balanced account known to me of what the preservation of monuments is there for, and some closely argued criticism of modern architecture—including a few excellent pages on monumentality (p. 202, etc.) and a rather crushing paragraph on the yearning for a new vernacular

(p. 212). Amongst the most impressive passages are those drawing literary parallels between Gandy and the *Lyrical Ballads* and between Butterfield and *Wuthering Heights*, parallels at first merely startling but at second thoughts, I think, completely convincing. Less convincing are in a few cases the actual pedigrees drawn up of architectural forms. The Circus at Bath, I would suggest, can not be derived from the Colosseum alone. Wren's *rond points* in the London plan of 1666 and the Place des Victoires are surely amongst its ancestors. And again in the case of Gandy's cottage designs, can they really be analysed without reference to Ledoux, whose *Architecture* of 1804 is in Sir John Soane's library or to Ledoux's predecessors such as Boullée? If proof is needed that they can't, it is found in Gandy's Cast Iron Necropolis of 1838, which was, Mr. Summerson tells us, a cellular pyramid, that is just the sort of thing the French Revolution architects would have gloated over.

But these are very minor points and must not in any way give the impression that they are meant to detract from one's respect for, and one's delight in, Mr. Summerson's book. NIKOLAUS PEVSNER

Theatres and Auditoriums, by *H. Burris-Meyer* and *Edward C. Cole*. (Progressive Architecture Library.) 11¾ in. viii + 228 pp. text illus. New York: Reinhold. [1949.] ($8.00.)

The fine performance of a play, an opera or a concert has at all times been one of man's most cherished, exciting and often unforgettable experiences. But it may not always be realized that this is due to an unprecedented amount of co-ordinated artistic efforts. There is the thought and language of the playwright, the music of the composer, the interpretation of the performing artist, the skill displayed in regie and decor, and last but not least the space creation of the theatre architect.

The architect's work is by no means confined to providing comfortable seating and a workable acting area. These are elementary provisions, but his artistic contribution to the success of a performance lies in his ability to create through the power of his design a festive and receptive atmosphere, essential both to actor and auditorium. A beautiful theatre—and this applies to ante rooms as well as auditorium—will in itself achieve such strong emotional impression that man's mind is rapidly raised from every day's hustle into the exalting sphere of art.

It has been said that a good play will attract crowds wherever it is performed. There is no proof for this, and I rather doubt it. But it has been proved by statistics that a theatre building of improved design has soon nearly doubled the number of patrons. So—no matter how efficient the stage machinery and how good the acoustic, the architect will at best produce a functional instrument unless he can skilfully solve the æsthetic problems. That does by no means imply that he can afford to neglect the manifold technical requirements but—as said before—these are elementary provisions and must be arranged so as to fit into his artistic conception. This point, I believe, can not be stressed strongly enough since there is in our time of over-specialization a tendency to present the fulfilment of function as an achievement in itself, and it appears from recent examples that the technical advisers had more than their due share in the architectural solution.

A good number of books has been written on the various technical subjects of theatre building—though some of the problems, i.e. acoustics have not yet been finally determined—but there exists to my knowledge no other book than the recent American publication, *Theatres and Auditoriums*, by Harold Burris-Meyer and Edward C. Cole, which in such comprehensive form deals with literally every technical problem arising in front, on, and behind the stage. All the numerous basic requirements for the comfort of the audience and the performance of a play, including its preparation, are intelligibly and precisely described, and this is a most valuable handbook to all those concerned with this type of building.

Perhaps a chapter on the history and development ought to have been included, as this would have provided the authors with the opportunity to describe the various attempts to achieve more flexibility and greater unity between audience and performance. As everywhere else there is here too a continuous development and progress and some of the experiments are offering useful signposts pointing towards future trends and aims. RUDOLF FRANKEL [*F*]

Essentials of Stage Planning, by *Stanley Bell, Norman Marshall* and *Richard Southern*. Illustrations by *Richard Leacroft*. (British Drama League.) 9¾ in. xi + 111 pp. + 4 pls. + folding pl. text illus. Frederick Muller. 1949. £1 1*s*.

There is a dire need for information concerning the planning of the theatre, and it is apparent that the British Drama League have thought so too, for they set up a special advisory committee to investigate the working problems of the stage itself. This book is the result of the investigation.

Of the three types of persons for whom the book has been especially written ('the practical man of the theatre; the architect and any committee planning a new building'), the committee will be best satisfied, for the simple informative approach and absence of much technical jargon makes a readable record of the basic requirements for the general stage, whether it be large or small. The experimental stage has been considered outside the scope of the book.

Most of the text has been devoted to the analysis of the minimum requirements of the stage itself, with particular reference to the need for understanding the usual methods employed in the handling and storage of scenery. Each wall of the stage is considered in turn, and related to its expected functions and the stage 'roof' as a means of suspending scenery and equipment.

The architect will find the book useful within limits, but will regret that certain of the 'ancillary offices', such as the carpenter's shop, scene store, dressing rooms, and so on, which are integral in stage planning, should be treated so superficially, and that such important and influential items as electrical and mechanical equipment should be foisted deftly on to yet another specialist.

Stage nomenclature is so personal to the theatre and so completely unintelligible to the layman, that the authors are to be congratulated on the method of presenting stage terms in an illustrative manner.

The book possesses an atmosphere of 'theatre' rare in technical books on the subject, and this quality is due in no small measure to the excellence of the illustrations by Richard Leacroft—in fact the book is an illustrator's fantasy.

HENRY ELDER [*F*]

Maps and Map-makers, by *R. V. Tooley*. 9¾ in. viii + 128 pp. + pls. text illus. Batsford. 1949. £1 10*s*.

Although there is, as the preface says, 'a considerable literature . . . on the subject of cartography . . . there has so far been no general work dealing with the whole subject'. This book covers, however, only the historical aspects of the subject in any detail, and the architect who is hoping to find practical assistance will have to look elsewhere. The Ordnance Survey, for instance, receives only passing mention, and so do triangulation and other topics of technical interest, but within the limited range this is a convenient and thorough treatise, bringing the story up to the middle of the 19th century.

The earliest map reproduced is from the 14th century B.C., the earliest English one being Anglo-Saxon, of the 10th century A.D. The general arrangement is first historical—on the earliest periods—and then geographical, covering virtually the whole world; Britain occupies two-fifths of the book, with Scotland and Ireland sharing a single chapter. There are two specific subject sections, one on marine atlases, the other on English county maps and atlases, from the famous Elizabethans, Saxton and Norden, onwards.

The book is lavishly illustrated, mostly by whole-page half-tones, though eight delightful colour plates are included. There are valuable chronological lists in many sections, bibliographies to all, and a good index with subjects in italics and figure numbers. H.V.M.R.

Castles from the Air. With introduction and notes, by *W. Douglas Simpson*. 11¼ in. × 8¾ in. 16 pp. + (112) pls. Country Life. 1949. £1 10s.

Fine aerial photographs of over a hundred of the more important castles in Britain provide the main feature of this pleasant book, which also contains brief descriptive notes on each building and an authoritative historical introduction by Dr. W. Douglas Simpson. J.C.P.

Mediæval Glass at All Souls College [Oxford]. A history and description based upon the notes of *G. M. Rushforth*, by *F. E. Hutchinson*. 10 in. (65) (67–2) pp. + (ii) + xxxi pls. Faber and Faber. 1949. £1 1*s*.

The priceless and well-preserved glass, dating from just before the middle of the 15th century, is in the ante-chapel of the college, which forms a western transept to the chapel proper (on the Merton model) and fronts to Catte Street between the High Street and Hawksmore's colonnade. This monograph, which usefully expands the account in the Royal Commission on Historical Monuments' *City of Oxford* (1939), clearly indicates the positions of the windows in the two halves of the east wall and in the west and north walls, though for a plan we must still refer to the Commission's volume. Although in part transferred from another part of the college and rearranged and repaired, the collection of glass is one of the finest in Oxford, so admirably representative of all periods (see Commission's sectional preface); it consists of figures in elaborate canopied niches, showing continental influence, with grisaille backgrounds. Iconographically the series consists of saints (in the east windows, upper lights), holy women (lower lights), kings (south window of west wall), bishops and doctors of the church (north window); these are enumerated in detail, as well as dress (with colours), emblems, and vestments, in the excellent index, and comparative tables of the series as they appeared in earlier descriptions are given. One appropriately surnamed John Glasier (pp. 17–18) executed the work. Parallels in Oxford and elsewhere are given, with references to original sources.

Not only G. M. Rushforth, but Canon Hutchinson, died before the work was completed. The printing (by MacLehose) is certainly up to Oxford standard, and the 33 half-tone plates, including two in colour, from photographs by Sidney Pitcher, do justice to the subjects.

It is greatly to be hoped that similar monographs will be produced on the other Oxford collections at New College and elsewhere, as well as the yet unpublished series in other cities. H.V.M.R.

Notes and Notices

NOTICES

Fourth General Meeting, Tuesday 7 February 1950 at 6 p.m.

The Fourth General Meeting of the Session 1949-50 will be held on Tuesday 7 February 1950 at 6 p.m. for the following purposes:

To read the minutes of the Third General Meeting held on 3 January 1950.

The President, Mr. Michael Waterhouse, M.C., to deliver an address to architectural students and present the Medals and Prizes 1950.

Mr. E. Maxwell Fry [*F*] to read a criticism of the designs and drawings submitted for the Prizes and Studentships 1950.

(Light refreshments will be served before the meeting.)

Fifth General Meeting, Tuesday 21 February 1950 at 6 p.m.

The Fifth General Meeting of the Session 1949-50 will be held on Tuesday 21 February 1950 at 6 p.m. for the following purposes:

To read the Minutes of the Fourth General Meeting held on 7 February 1950; formally to admit new members attending for the first time since their election.

Mr. Noel Rooke to read a paper on *The Work of Lethaby, Webb and Morris*.

(Light refreshments will be served before the meeting.)

Session 1949-50. Minutes III

At the Third General Meeting of the Session 1949-50, held on Tuesday 3 January 1950 at 6 p.m.

Mr. Michael Waterhouse, M.C., President, in the Chair.

The meeting was attended by about 350 members and guests.

The Minutes of the Second General Meeting held on 15 November 1949 having been published in the JOURNAL, were taken as read, confirmed and signed as correct.

The following members attending for the first time since their election were formally admitted by the President:

AS FELLOWS:

David Carr, S. A. Hurden, Egon Riss, Martin J. Slater, A. C. Tripe, Cyril H. Walker.

AS ASSOCIATES:

A. R. Ballantyne, Miss D. A. Baxter, T. W. Bliss, V. J. Bloom, P. L. B. Borthwick, A. J. Brandt, W. S. Bryant, C. F. H. Cawsey, Ian Colquhoun, D. B. Coombe, R. C. Cox, Gerald Davis, P. R. Davison, E. W. Ebery, J. W. Edwards, A. M. S. Forrest, R. W. Freeborn, L. J. P. Halstead, S. N. Hewitt, P. B. Horsbrugh, M. L. Jenkins, S. Keay, A. N. Leifer, Mrs. E. S. Locke, C. G. Long, J. W. McArtney, A. G. McCulloch, W. J. May, G. K. Messervy, L. J. Morton, T. H. M. Nesbitt, G. Newman, Miss R. J. Parsloe, The Hon. George Pease, J. S. F. Pinnock, R. E. Race, C. H. Rusna, H. S. Scorer, K. P. Smith, H. S. Smith, S. H. Smith, W. J. Starkey, C. R. V. Tandy, D. F. Tandy, R. G. Thomson, V. W. Trinder, A. A. E. Trofimov, J. F. Vanston, A. J. Weeks, R. J. Wettaway, W. G. Whear, T. J. Whittaker, B. M. Willcox, Miss O. M. D. Winter, M. A. Wolstenholme, J. S. Wyatt.

AS LICENTIATES:

T. M. Burrows, G. K. Findlay, Cecil Huskinson S. F. Smart, G. R. Taylor.

The Secretary read the Deed of Award of Prizes and Studentships made by the Council under the Common Seal.

Mr. Hope Bagenal, D.C.M. [*F*] having read a paper on *Concert Halls*, a discussion ensued and on the motion of Dr. Alexander Wood, M.A., seconded by Mr. Basil Cameron, a vote of thanks was passed to Mr. Hope Bagenal by acclamation and was briefly responded to.

The proceedings closed at 8.20 p.m.

Exhibition of Prize Drawings, 4 January to 7 February 1950

The exhibition of designs and drawings submitted for the Prizes and Studentships 1950 will remain open until Tuesday 7 February 1950 between the hours of 10 a.m. and 7 p.m. (Saturdays 10 a.m. and 5 p.m.)

British Architects' Conference, Bristol, 7-10 June 1950

The next Annual Conference of the R.I.B.A. and its Allied and Associated Societies will be held at Bristol from 7 to 10 June inclusive at the invitation of the Bristol Society of Architects, who will be celebrating their centenary.

It is expected that there will be a large number of members from all parts of the country, and they are advised to arrange their hotel accommodation at the earliest possible moment.

The Conference Executive Committee have supplied a list of hotels in Bristol and Bath, which is published below.

Architectural Science Board Lecture, Tuesday 14 February 1950 at 6 p.m.

A lecture will be given on Tuesday 14 February 1950 at 6 p.m., when Mr. R. T. Walters [*A*] will read a paper on *Developments in Timber Technique*.

Synopsis

1. Introduction. The architect's problem. Origins of research. Main lines of development.
2. Technical approach. Loading conditions and safe working stresses. Increase factors and tolerances. Sources of data. Mechanical connections. Lamination.
3. Visual approach. Comparative lightness.

British Architects' Conference, Bristol. Hotel accommodation in Bristol and Bath available for the nights of 7, 8, 9 and 10 June 1950.

	ROOMS			TARIFF		Minutes from Conference Hqrs.
	With double beds	With twin beds	With single beds	Bed and breakfast per person	Full daily per person	
BRISTOL						
Bright's Hotel, Elmdale Road	10	—	10	From 17/6	From 26/6	7†
Grand Hotel	10	10	10	21/-	30/-	10†
Grand Spa Hotel	—	25	10	21/-	30/-	10
Hawthorns, Woodland Road	10	10	10	14/6*	21/-*	7†
Kinbourne Hotel, Queen's Road	6	3	3	15/6	25/-	7
St. Vincent's Rocks Hotel	5	8	5	18/6	25/-	10
BATH						
Bromley Hotel, Russel Street	3	19	6	From 13/6*	From 22/6*	35
Cleveland Hotel, Pulteney Street		3/4				35
Donnybrook, Russel Street	4	2	6	13/6	25/-	35
Fernley Hotel	5	—	5	17/6	27/6	35
Lansdown Grove Hotel	3	—	—	18/6	27/6	35
Royal York Hotel	—	10	—	17/6*	27/6*	35
Southborne Private Hotel	4	9	14	18/6	30/-	35
Westbourne Hotel	15	12	8	16/6	21/-	35

* Plus 10 per cent surcharge.

† These hotels are estimated as walking distances, while the others are given as travelling time by public or other transport at a rate of 25 m.p.h.

In addition, the following hotels are available, but no specified accommodation has been reserved by them for Conference Members: **Bristol**—College Close Hotel Greyhound Hotel, Grosvenor Hotel, Rodney Hotel and the Royal Hotel. **Bath**—Sheriff's Private Hotel, Waldon's Hotel, and the Grand Spa Hotel. **Near Bristol:** Walton Park Hotel, Clevedon, and the Limpley Stoke Hotel, nr. Bath.

Characteristics of modern timber frames.
Characteristics of glued laminated structures.
Comparison of structural forms in timber and other materials.
4. Conclusion. Role of the timber engineer.

The Reception of New Members at General Meetings

The procedure for the introduction and reception of new members at General Meetings has been revised and is now as follows. New members will be asked to notify the Secretary R.I.B.A. beforehand of the date of the General Meeting at which they desire to be introduced and a printed postcard will be sent to each newly-elected member for this purpose. On arrival at the R.I.B.A. new members must notify the office of their presence and will then take their places in the seats specially numbered and reserved for their use. On being asked to present themselves for formal admission, the new members will file out in turn into the left-hand aisle and after shaking hands with the Chairman will return to their seats by way of the centre aisle.

It will not now be necessary for new members to be accompanied by supporters.

Formal admission will take place at all the Ordinary General Meetings with the exception of those on the following dates:

7 February 1950. Presentation of Medals and Prizes.

4 April 1950. Presentation of Royal Gold Medal.

Annual Subscriptions and Contributions

Members' subscriptions and Students' contributions for 1950 became due on 1 January. The amounts are as follows:

	£	*s.*	*d.*
Fellows	7	7	0
Associates	4	4	0
Licentiates	4	4	0
Students	1	11	6

For members resident in the trans-oceanic dominions who are members of Allied Societies in those dominions, and for members resident overseas in areas where no Allied Society is available, the amounts are as follows:

	£	*s.*	*d.*
Fellows	4	4	0
Associates	3	3	0
Licentiates	3	3	0

Cessation of Membership

Under the provisions of Bye-law 21 the following has ceased to be a member of the Royal Institute:

As Associate
Daniel Peter O'Herlihy.

COMPETITIONS

Whitehaven: Arts Centre

The Whitehaven Corporation invite architects resident in this country to submit designs in competition for the Public Hall and Restaurant, which they propose to erect in Whitehaven.
Assessor: Mr. Harold A. Dod, M.A. [*F*].
Premiums: £300, £250, £175.
Last day for submitting designs: 15 March 1950.

Conditions may be obtained on application to the Town Clerk, Town Hall, Whitehaven, Cumberland. Deposit £2.

Competition for War Memorial for Victoria College, Jersey

The Association of Old Victorians invite architects of British nationality to submit designs in competition for proposed War Memorial Buildings in the form of a small Art School at Victoria College, Jersey, C.I.
Assessor: Mr. A. E. O. Geens [*F*].
Premiums: £75, £50, £25.
Last day for submitting designs: 3 April 1950.

Conditions may be obtained on application to Mr. A. H. Worrall, Hon. Treasurer, The Association of Old Victorians, 25 Cleveland Road, Jersey, C.I. Deposit £1 1*s*.

Civic Hall, Guildford

The Guildford Borough Council invite architects registered in the United Kingdom to submit designs in competition for the Civic Hall which they propose to erect in Guildford.
Assessor: Mr. G. A. Jellicoe [*F*].
Premiums: £1,000, £500, £250.
Last day for submitting designs: 30 April 1950.

Conditions may be obtained on application to the Town Clerk, Municipal Offices, Guildford. Deposit £2 2*s*.

Competition for Medical Buildings Extension, Edinburgh University

The University of Edinburgh invite architects to submit designs in competition for an extension to the Medical Buildings to be erected on a site on the north side of George Square, Edinburgh.
Assessor: Mr. A. G. R. Mackenzie, A.R.S.A. [*F*].
Premiums: 1,000 gns., 600 gns., 300 gns.
Last day for submitting designs: 30 September 1950.
Last day for Questions: 18 March 1950.

Conditions may be obtained on application to the Secretary of the University, Edinburgh. Deposit £2 2*s*.

Competition for the Design of Concrete Bridges

The Cement and Concrete Association invite engineers and architects to submit designs in competition for prestressed, reinforced or plain concrete bridges over motorways.
Assessors: Sir Percy Thomas, O.B.E. (Past President); Mr. J. Cuerel, B.Sc., M.I.C.E.; Mr. A. Moller, M.I.Struct.E.; Mr. E. John Powell, M.I.C.E., M.I.Mun.E.; Mr. J. Reed, B.Sc., M.I.C.E., M.I.Struct.E., M.Cons.E.
Premiums: £500, £300, £200.
Last day for submitting designs: 31 May 1950.

Conditions may be obtained on application to the Cement and Concrete Association, 52 Grosvenor Gardens, S.W.1. Applications must be accompanied by a postal order for one shilling.

BOARD OF ARCHITECTURAL EDUCATION

Bernard Webb Studentship

The Bernard Webb Studentship for the historical and critical study of architecture, which is open to members of the Architectural Association and tenable under the auspices of the British School at Rome, has been awarded to Mr. Patrick Horsbrugh [*A*], for a study of Civic Design in the smaller Italian hill towns.

ALLIED SOCIETIES

Changes in Officers and Addresses

Hampshire and Isle of Wight Architectural Association. Secretary, Miss F. Vaughan, 39 Portland Terrace, Southampton. *Isle of Wight Chapter.* Hon. Secretary, Mr. S. H. E. Mansbridge, 'Fernbank', Red Road, Wootton, Isle of Wight.

Northamptonshire, Bedfordshire and Huntingdonshire Association of Architects: Huntingdonshire Branch. Correspondent, Mr. J. A. Wardley, 4 Market Hill, Huntingdon. *Bedfordshire Branch.* Correspondent, Mr. H. Hartley [*A*], 25 Dell Lane, Biggleswade, Beds.

Liverpool Architectural Society: Annual Dinner 1949

On 11 November the Liverpool Architectural Society held its Annual Dinner at the Adelphi Hotel, Liverpool. Among those present were the President, R.I.B.A., Mrs. Waterhouse, and Mr. C. D. Spragg and several eminent guests, including the Lord and Lady Mayoress, His Grace the Archbishop of Liverpool, the Very Rev. Dean of Liverpool, and Mr. W. E. Tyson, President, Liverpool Regional Federation of Building Trades Employers.

The President, R.I.B.A., proposed the toast of 'The Liverpool Architectural Society', to which Mr. F. C. Saxon, M.C., F.R.I.C.S., J.P. [*F*], President of the Society, responded. Dr. R. Downey, Archbishop of Liverpool, who is an Honorary Fellow, R.I.B.A., and of the L.A.S., praised the city's charms when proposing the toast of 'The City of Liverpool', and the Lord Mayor replied. A member of the Society, Mrs. Margaret Baron [*A*], proposed 'The Guests', and this was responded to by Mr. W. E. Tyson.

The whole function proved most successful and formed an encouraging commencement to the Society's 102nd Session.

GENERAL NOTES

Decorations and Distinctions

Major T. H. B. Burrough, R.E. (T.A.), A.R.W.A. [*F*], has been awarded the Territorial Army Efficiency Decoration and 1st Clasp. Capt. (Hon. Major) E. Roughley, R.E. (T.A.) [*L*], has been awarded the Territorial Army Efficiency Decoration. (London Gazette, 6 December 1949.)

Architectural Association Scholarships in Architecture

The Council of the Architectural Association offers the following Scholarships in Architecture:

ENTRANCE SCHOLARSHIPS

The Leverhulme Scholarship. Value £200 per annum.
The Minter Open Entrance Scholarship. Value £100.
The Sir Walter Lawrence Open Entrance Scholarship. Value £100.
The Metal Window Scholarship (presented by The British Metal Window Manufacturers' Assoc. Ltd.). Value £75 per annum.
The Natural Asphalte Council Scholarship (presented by The Natural Asphalte Mine-Owners and Manufacturers' Council). Value £50 per annum.

These Scholarships, which are tenable for five years at the A.A. School of Architecture, will be available to students of British nationality. They will be awarded for one year, with the intention that they shall be renewed from year to year until the student has completed the course; renewal being subject to a satisfactory report of the student's progress, and to proof of the continued need for such assistance.

SENIOR ENTRANCE SCHOLARSHIPS

The Metal Window Senior Scholarship (presented by The British Metal Window Manufacturers' Assoc. Ltd.). Value £50 per annum.

This Scholarship, which is tenable for two years at the A.A. School of Architecture, is open to students of British nationality, who have passed the Intermediate Examination of the R.I.B.A., either externally, or at another Recognized School of Architecture, and is for entry to the fourth year of the course, and subject to satisfactory progress by the student, will be renewed for the fifth year.

Full particulars and forms of application may be obtained from the Principal, Architectural Association School of Architecture, 36 Bedford Square, W.C.1, to whom they should be returned not later than 1 March 1950. This is also the closing date for applications for the Entrance Examination which will be held on 28 March 1950.

Obituaries

George Drysdale [*F*]. The death was announced on 10 November 1949 of George Drysdale at the age of 68, who was in partnership with Mr. Arthur Ledoyan [*A*] at Edgbaston, Birmingham. He had a distinguished career as a student, winning the Pugin Studentship in 1906, the Soane Medallion in 1908, and the Tite Prize in the same year. He was elected Associate in 1911 and Fellow twelve years later.

In 1916 Mr. Drysdale went to Canada and spent the next three years working on the plans for the new Houses of Parliament, Ottawa.

He was for many years a member of the Board of Architectural Education and had also served on the Prizes and Scholarships Committee, the Schools Committee, the Visiting Board and the Literature Standing Committee.

Mr. Arthur Ledoyen [*A*], his partner, sends the following appreciation by a group of Mr. Drysdale's former students:

'George Drysdale, Director of the Birmingham School of Architecture from 1924 to 1947, died on 10 November in Birmingham. On 22 November he was to have received the Birmingham Civic Society's Gold Medal from the Lord Mayor for his services to architectural education.

'Mr. Drysdale was an articled pupil of Leonard Stokes, and worked in the office of Sir Ernest George. After study in France and Italy, he started practice in London in 1911, and in 1916 went to Canada to work for three years on the new Houses of Parliament in Ottawa. From the time of his return until 1942 he practised in London under the name of Leonard Stokes and Drysdale, having been taken into partnership by Mr. Stokes. He lived a great deal of his time at the Arts Club until it was demolished by enemy action.

'Since his retirement from the School of Architecture in 1947 he had remained in practice in Birmingham in partnership with me. He was unmarried.

'Examples of his work in this country are: Roman Catholic churches at St. Hubert's, Warley, Birmingham; The Holy Family, Small Heath, Birmingham; Our Lady of the Rosary, Saltley, Birmingham; St. Joseph's, Weymouth; St. Chad's, South Norwood; St. Michael and St. Martin, Hounslow; Priory of St. Mary, Bodmin, Cornwall (unfinished); Catterick Camp, Yorkshire; Ruislip Catholic Church; Church of the Most Holy Saviour, Lynton, Devon; Mission Church of St. Austell, Cornwall. Alterations and additions to the following: Coton College, Staffs; Convent of La Retraite, Clapham Park; Church of the Holy Ghost, Balham; Chapel of Our Lady, Launceston, Cornwall; St. Chad's Cathedral, Birmingham; Plymouth Cathedral; Holy Trinity Church, Newquay, Cornwall; St. Philip's Church, Smethwick; Emmanual College, Cambridge; St. Bridget's Church, Isleworth; St. Anthony's Convent, Aldershot; School at Trent Vale, Stoke-on-Trent; and many other churches, religious establishments and schools throughout the country.

'His death will come as a personal loss to every former student of the Birmingham School, where he will be remembered as a severe but honest critic with a surprising knowledge of the individual character and capacity of each student. A few of his words went a long way: one quickly learnt to ponder on every phrase he uttered and the occasional word of encouragement really meant something.

'His training at the Ecole des Beaux Arts left him with a profound respect for the logic of the French, and he developed their methods with great success in Birmingham. He, himself, remained a student always, but he despised any currently fashionable architectural idiom unless it sprang naturally from a building's purpose and setting. He favoured the term "organic design" long before it was generally popular. History was a live subject with George Drysdale, for he knew at first hand most of the great examples, not only of architecture but the sister arts of sculpture, painting and the grand composition. Having an acute sense of observation, he encouraged his students to look at all buildings and to absorb all there was to be seen. Travelling abroad whenever possible, he was well-informed of current European and American work. France was his particular preference.

'He was by nature reserved and modest, but to those who were privileged to know him intimately, he was a grand conversationalist. His never-ending reminiscences, often with a humorous twist against himself, were always alive. About student days he was very reticent, but a glance at the R.I.B.A. Kalendar shows that within two years he won the Pugin, Tite and Soane Prizes—the last two in the same year. His large frame harboured a large mind and a large soul. He was the most outspoken and sincere of men, fearing no one yet full of humility. He detested nothing more than motives of self-advertisement and self-gain. Although the profession of architecture has suffered a great loss by his passing, his influence will last for many years.'

Robert Matthew Mitchell [*F*], senior partner in the firm of Smart, Stewart and Mitchell (R. M. Mitchell [*F*], J. Morrison, A.R.I.A.S., and H. C. Miller [*L*]), of 40 Tay Street, Perth, commenced practice in 1919 with Mr. D. A. Stewart (of Smart and Stewart, Perth) under the style of Smart, Stewart and Mitchell. He was articled to Mr. Reginald Fairley of Edinburgh, and later practised in Crieff, Perthshire, and from 1911-16 in Edmonton, Alberta.

On the death of Mr. D. A. Stewart in 1940, Mr. Mitchell remained the sole partner in the firm until he took into partnership Mr. J. Morrison and Mr. H. C. Miller.

R. M. Mitchell had an innate sense of beauty, both of proportion in the mass and in the value of fine decorative touches and good craftsmanship in wood, stone and metal. This artistic feeling is abundantly reflected in the large number of fine designs executed under his guidance in his ecclesiastical buildings embracing new churches, alterations to existing ecclesiastical buildings and the design of church furniture and ornament.

Among his principal architectural works were: Westmount Public School, Alberta, Perth Dye Works, St. Catherine's Road, Art Gallery and Natural History Museum, United Free Church, Kinnoull Street, the Royal George Hotel, Masonic Temple, Nurses' Home, Murray Royal Asylum, extension and alterations to Messrs. James McEwen and Co.'s ladies' outfitters and drapers' premises, extensions and renovations to County and City of Perth Savings Bank, Tay Street, all in Perth, the Golf Club House at Rosemount Blairgowrie, and the Gannochy Housing Estate, Perth, for Messrs. Arthur Bell and Sons Ltd.

When the Gannochy Housing Estate (1924-29) was erected it was unusual of its kind. Comprising 250 detached single-storey stone built houses, situated on rising ground to the North-west of Perth, all the houses were placed with a south to south-west aspect, and particular attention was given to attractive grouping and the retention of fine natural features.

Mr. Mitchell was a Fellow of the Royal Incorporation of Architects in Scotland and a past member of the R.I.A.S. Council, being its Vice-President from 1939-40: in that same year he was President of the Dundee Chapter and also represented the R.I.A.S. Council on the R.I.B.A. Council. He was a member of the Alberta Association of Architects.

He was born in 1874 and died on 28 September 1949.

Brigadier Godfrey T. Hurst, D.S.O., O.B.E., V.D., J.P. [*F*], died in South Africa on 26 March, aged 78. Well-known in Durban and Johannesburg architectural circles, Brigadier Hurst had a long and outstanding military career, and his military funeral with its impressive procession was one of the most stirring funerals seen in Durban for many years, thousands of people watching the flag-draped coffin borne to Durban's West Street Cemetery on a gun-carriage drawn by an artillery tractor and preceded by high-ranking South African military leaders. Brigadier Hurst had 56 years service in, or attached to, the Natal Mounted Rifles, which he joined as a Trooper in 1891. By 1920 he had risen to the command, and was later promoted to Colonel on the Special Staff List of the Union Defence Force and, after his transfer to the Reserve of Officers, he was in June 1947 promoted to the honorary rank of Brigadier.

Upon the outbreak of the last war he was called up on his 69th birthday and appointed Officer-in-Charge of Regimental Records and Depot in Durban. Shortly afterwards he was appointed to the War Recruiting Committee, and at the end of the war served on the Demobilization Committee, dealing with the resettlement of the architects' and quantity surveyors' sections. He saw 13 years' service in the Anglo-Boer War, the Zulu Rebellion and 1914-18 War, eight of these being in the field.

He practised in Durban for 45 years, in partnership with Mr. Thomas Reed, from 1903 until Mr. Reed's death in 1934, when he carried on alone the firm of T. Reed and Hurst until 1937, and from July 1937 until his death he practised with Mr. W. J. Gunn as G. T. Hurst and Gunn. Brigadier Hurst was official architect to some well-known South African Building Societies. He was President of the Natal Provincial Institute of Architects from 1922-30. For long closely identified with technical education, Brigadier Hurst served as a member of the Council of the Natal Technical College for 25 years.

Allen Collier James [*Ret. A*] did not practise architecture. He travelled widely and had considerable ability as a lecturer. He was for seven years a master in the English College, Buenos Aires, during which period he travelled extensively in the South Americas, obtaining a valuable collection of photographs of natives and their surroundings, under primitive conditions. The Ethnographical Section of the British Museum accepted some of these for use as lantern slides. From time to time he travelled extensively in Europe, and was a Fellow of the Geographical Society. He died on 1 November last, aged 73.

A. Ainsworth Hunt [*L*], senior partner in the firm of Hunt and Coates, of Bury St. Edmunds, was 81 when he died on 4 December 1949. He practised in Sudbury from 1888-1908, and thereafter in Bury St. Edmunds and Stowmarket. He was joined in partnership by Mr. G. Lister Coates [*L*] in 1919.

Mr. Hunt was the architect of the Shirehall, Bury St. Edmunds, and of schools at Mildenhall and other places in East Anglia. He specialized in church restoration and repair.

Albert Edward Kingwell [*F*] studied at the Ecole de Dessin, Paris, the A.A. and at South Kensington Art School before being articled to the late George Edwards. He began in private practice in 1886, and was principally engaged on works under the administration of the Court of Chancery and the Duchy of Lancaster.

He was 86 at the date of his death, 10 November 1949. Mr. Kingwell took up residence at Hadley Wood in 1902, and developed the Beech Hill Park Estate there, as well as carrying out many estate development schemes in Hertfordshire. Interested in municipal affairs, he was a member of the Enfield Council for many years, serving on many committees; as a member of the Middlesex County Council he served for some years on the Town Planning Committee.

T. Bowhill Gibson [*L*], senior partner in the firm of T. Bowhill Gibson and Laing, of Edinburgh, died on 27 September last, aged 54. He commenced practice in Edinburgh in 1922. His principal architectural works were the Rutland, Astoria, Dominion and County cinemas in Edinburgh, The Playhouse, Perth, The Regal at Dunfermline, and the Rio at Kirkcaldy, as well as the reconstruction of the Theatre Royal, Edinburgh. Although he specialized in cinema and theatre work, Mr. Gibson was the architect of a block of flats at Queensberry Road, Edinburgh, and was responsible for the housing schemes at Penicuik from 1931-40.

Mr. James W. Laing [*A*] will carry on the practice at 36 Palmerston Place, Edinburgh, under the name of T. Bowhill Gibson & Laing.

Joseph Weekes, O.B.E. [*F*]. The death occurred on 10 December last of Joseph Weekes, who retired about three years ago from his appointment as County Architect for Dumbarton (an appointment he had held for thirty years). He was prominent in Scottish architectural affairs, and was a member of the Scottish Housing Advisory Committee on the 'Design, Planning and Furnishing of New Houses', which produced the well-known report, published in 1944, entitled 'Planning our New Homes'.

In his official capacity, he designed and carried out many housing schemes, police stations, hospitals, clinics, social service centres and other county administrative buildings.

Mr. A. Graham Henderson, A.R.S.A. [*F*], senior partner in the firm of John Keppie and Henderson and J. L. Gleave, Glasgow, writes: 'Joseph Weekes, who died recently, was County Architect for Dumbarton for about thirty years. During that time he carried out a great deal of work, public buildings, schools and housing, and also found time to take an interest in the affairs of the profession, serving on the Council of the Royal Incorporation of Architects in Scotland and taking a keen interest in architectural education as a Governor of the Glasgow School of Art.

'Such a bald statement regarding Mr. Weekes would fail to do justice to such an interesting and notable personality as "Joe" Weekes. His work, particularly his housing work, was outstanding in quality. Mr. Weekes was an Englishman, born, I believe, in the south of England, but he came to Scotland very early and got his architectural training in Edinburgh. He understood and handled Scottish tradition in domestic architecture far better than most Scotsmen. He was an official who defied the restrictions of officialdom, and it is no exaggeration to say that he set a new standard in housing design in Scotland. He was particularly successful in his groups of "attached" houses, and he gave the most careful consideration to the surroundings when designing his housing schemes. He achieved a variety of design which was remarkable in a field where the official attitude was to build to types. He was awarded the O.B.E. for his work, and also received the award of the Saltire Society Medal for one of his housing groups.

'His school work was marked by good planning and straightforward design, and he achieved that combination which is unfortunately rare, namely, art without eccentricity.

'His personal qualities were what might be expected from one taking such a definite stand for the art of architecture. His opinions on any subject were expressed forcibly, and he had a clear understanding of the essentials of any problem. He was intolerant of meanness and a very generous and loyal friend.'

Membership Lists

ELECTION: 3 JANUARY 1950

The following candidates for membership were elected on 3 January 1950.

AS HONORARY ASSOCIATES (4)

Bodkin: Thomas, M.A., Barrister-at-law, D.Lit. (N.U.I.), Lit.D. (T.C.D.), M.R.I.A., Hon. R.H.A., Birmingham.
Kendrick: Thomas Downing, M.A., Hon.D.Litt., F.B.A., F.S.A.
Lea: Frederick Measham, O.B.E., D.Sc., F.R.I.C., Berkhamsted.
Leslie: Ian Murray, J.P.

AS HONORARY CORRESPONDING MEMBERS (2)

Dedoyard: Georges, Liege.
Dumont: Alexis C. M., Brussels.

AS FELLOWS (6)

Eden: William Arthur, M.A. (L'pool) [*A* 1929], Leeds.
Gifford: Robert Claude, M.B.E. [*A* 1931], West Bromwich.
Herrmann: Fritz Heinrich Joseph [*A* 1947].
Marston: Winston Ewart [*A* 1933], Cambridge.
Osburn: William John Arthur [*A* 1931].
Tubbs: Grahame Burnell [*A* 1918].

AS ASSOCIATES (81)

Ainsworth: Edward Nuttall, Oldham.
Allan: George Lyon, St. Andrews.
Arthur: Mary Kathleen (Miss), Dip.Arch. (Leics), Leicester.
Atkinson: James Clifford, Dip.Arch. (Dunelm), Sunderland.
Bailey: John Gordon, Dip.Arch. (Leeds), Leeds.
Baxter: Gerald Malcolm, Huddersfield.
Beer: Arthur Thomas, B.Arch. (Wales), Newport, Mon.
Beresford: Dennis, Langley Mill.
Bishop: Rosa (Mrs.).
Brown: Basil George, Dip.Arch. (Leics), Kettering.
Browne: John Lindsay, B.Arch. (Dunelm), Newcastle-upon-Tyne.
Butler: Anne Judith (Miss), Lincoln.
Buzas: Stefan.
Calow: Dennis Arthur, Dip.Arch. (Leics), Bristol.
Campbell: John Barton, Blackburn.
Candlish: Laurie Campbell, Dip.Arch. (Leics), Leicester.
Clark: Eric, Manchester.
Clayton: Donald Francis, Derby.
Collins: Stanley Francis, Oxford.
Corby: Eric Roy.
Cowbourne: Hilda Margaret (Miss), Dip.Arch. (Leeds), Bradford.
Crick: Norman Victor Albert, Reading.
Crosby: George Richard, Chesterfield.
Curtis: Edward James William, Leicester.
Darge: George Leslie, Newcastle-on-Tyne.
Davenport: Peter Brian, Manchester.
de Souza: Arnold Jeremy.
Dewar-Mills: Donald Campbell.
Diamond: John Bedford, B.Arch. (Hons.) (L'pool), Cambridge.
Eastwood: James Donald, Harrogate.
Eatwell: Peter Franklin.
Farrer: Walter Ronald, B.Arch. (Hons.) (Dunelm), Ebchester.
Fielding: Allen Henry.
Gelibter: Adam Adolf.
Gibbs: Frank Peter Russell, Cambridge.
Godsmark: Norman Harry, Newcastle-on-Tyne.
Hall: George Harold Emmett, D.A. (Dundee), Hamilton.
Halliday: Anthony Mark Douglas, Hemel Hempstead.
Harker: Leslie Wilson, D.F.C., Leeds.
Harmer: Donald Leonard, Leicester.
Hind: Arthur William Henry, Dip.Arch. (Leics), Leicester.
Holman: Ian Hamilton, Bournemouth.
Holmes: Francis Charles.
Hume: John David, Kingston-upon-Thames.
Iredale: Ralph Norman David, Dip.Arch. (L'pool), Burrelton.
Johnson: Peter Eatough, Farnham.
Jones: Eric Scargill, Hull.
Kemp: Ronald George.
Kirkman: Alan Clifford, Dip.Arch. (Leics), Newcastle-upon-Tyne.
Lee: Alan Oliver, Blyth.
Leven: James Findlay.
Lewis: John David Jacob, Llandyssul.
Lyell: Michael George Rudinge.
MacRitchie: Alistair Crawford Cameron, Glasgow.
Mair: John Archibald Duguid, Glasgow.
Markus: Thomas Andrew, B.A. (Hons. Arch.) (Manchester), Manchester.
Mead-Kidd: Peter Byron, Dip.Arch. (Nott'm), Nottingham.
Milton-Hine: Raymond Richard, Dip.Arch. (Leics), Minehead.
Morgan: John Robert.
Pearce: Margaret Ricardo (Mrs.).
Pye: Ronald Leonard, Ilford.
Roberts: Basil Miles, Wallasey.
Robinson: Dale, Derby.
Seaman: Hugh Wynn, Cardiff.
Serby: Anthony Sinclair.
Shand: Audrey Elizabeth (Miss), Herne Bay.
Spence: Julie Margaret (Mrs.).
Stephenson: John, Newcastle-upon-Tyne.
Subiotto: George John.
Summerbell: Marjorie (Miss), B.Arch. (Hons.) (Dunelm), Sunderland.
Sunderland: Geoffrey, Bradford.
Thompson: John Christopher, B.E., B.Arch. (Dublin), A.M.I.C.E.I., Limerick.
Trasler: Shirley Barbara (Miss), Derby.
Ward-Willis: Michael John, Dip.Arch. (Leics), Glenfields.
Warner: James William, B.Arch. (Hons.) (L'pool), Wallasey.
Way: John Norman, Carmarthen.
Wheeler: John Edward, Leicester.
Wilford: Edmund, Leicester.
Wilson: Geoffrey, Dip.Arch. (Leeds), Luddendenfoot.
Wood: Leslie George, Newcastle-upon-Tyne.
Yates: John Burns, Cupar.

AS LICENTIATES (8)

Beaumont: John, Chester.
Billam: John, Brighton.
Cook: Maurice Henry Arthur, Plymouth.
Marston: Frederick William.
Pople: Cecil Davey, Plymouth.
Stilwell: Frank Stuart, Plymouth.
Wash: William Todd.
Wincer: Arthur Charles Boys.

ELECTION: 7 FEBRUARY 1950

An election of candidates for membership will take place on 7 February 1950. The names and addresses of the candidates with the names of their proposers, found by the Council to be eligible and qualified in accordance with the Charter and Bye-laws, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Monday 30 January 1950.

The names following the applicant's address are those of his proposers.

AS HONORARY ASSOCIATES (2)

Deakin: Ralph, O.B.E., Knight of the Dannebrog Order, 41 Gordon Mansions, W.C.1. Proposed by the Council.

Evans: Joan, D.Litt., D.Lit., F.S.A., Thousand Acres, Wotton-under-Edge, Glos.; 72 Campden Hill Court, W.8. Proposed by the Council.

AS HONORARY CORRESPONDING MEMBER (1)

Schumacher: Hubert, Architecte de L'Etat-Directeur, 10 Rue du St. Esprit, Luxembourg. Proposed by the Council.

AS FELLOWS (4)

Firth: Francis Digby [*A* 1937], 318 Latymer Court, W.6. E. M. Rice, C. L. Gill, E. M. Fry.

Goldsmith: Humphrey Hugh [*A* 1931], 7 Bridge Street, Bath; The Church House, Wellow, nr. Bath. G. R. Dawbarn, A. B. Grayson, J. M. Easton.

Wakeford: Henry Kenneth [*A* 1936], 7 Connaught Place, Hyde Park, W.2. M. R. Hofler, D. L. Bridgwater, T. E. Scott.

Westerman: Albert Edwin, A.A.Dip. (Hons.) [*A* 1930], 9 Old Burlington Street, W.1; 235 Pickhurst Lane, West Wickham, Kent. D. J. Moss, the late A. S. R. Ley, A. H. Ley.

AS ASSOCIATES (46)

The name of a school, or schools, after a candidate's name indicates the passing of a recognized course.

Allen: Edward Taylor (Leeds Sch. of Arch.), Hollin Bank, Hawes, Yorkshire. Applying for nomination by the Council under Bye-law 3 (*d*).

Bain: David, D.A. (Edin) (Edinburgh Coll. of Art: Sch. of Arch.), 148 John Street, Penicuik, Midlothian. W. I. Thomson, J. R. McKay, Leslie Grahame-Thomson.

Bebb: William Thomas, Dip.Arch. (Cardiff) (Welsh Sch. of Arch.: The Tech. Coll., Cardiff), 11 Barkley Street, Abertysswg, Rhymney, Mon. Lewis John, Harry Teather, C. F. Jones.

Black: John Peter Raby (Liverpool Sch. of Arch.: Univ. of Liverpool), 17 Leigh Hall Road, Leigh-on-Sea, Essex. Prof. L. B. Budden, B.A. Miller, D. Brooke.

Bourne: Michael Rex (Leicester Coll. of Art and Tech. Sch. of Arch.), 23 Haldon Road, St. David's Hill, Exeter. F. Chippindale, G. A. Cope, S. Penn Smith.

Bramwell: John Harbron (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne, Sch. of Arch.), 29 Bracken Road, Darlington, Co. Durham. Prof. W. B. Edwards, E. M. Fry, J. H. Napper.

Brock: David Le Marchant, B.Arch. (Hons.) (L'pool) (Liverpool Sch. of Arch., Univ. of Liverpool), 4 Bentley Road, Liverpool, 8. Prof. L. B. Budden, F. X. Velarde, B. A. Miller.

Brown: Philip Vaughan, B.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 46 Grange Mount, Birkenhead. Prof. L. B. Budden, F. X. Velarde, B. A. Miller.

Bull: Roy Herbert Ernest (Northern Poly. (London): Dept. of Arch.), 159 Friern Road, E. Dulwich, S.E.22. E. E. Somake, Norman Keep, T. E. Scott.

Carver: Kenneth Maltby, D.F.C. [Final], 'The Laurels', 103 Daws Heath Road, Rayleigh, Essex. J. M. Scott, A. S. Belcham, P. G. Hayward.

Catleugh: John Denis Harwood (Bartlett Sch. of Arch.: Univ. of London), 42 Gilpin Avenue, S.W.14. Prof. H. O. Corfiato, L. S. Stanley, D. du R. Aberdeen.

Clarke: Peter Burrough, B.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 17 Mayfield Road, Ashbourne, Derbyshire. Prof. L. B. Budden, F. X. Velarde, D. Brooke.

Cleverly: Lionel Mark [Final], 27 Kensington Road, North End, Portsmouth. R. A. Thomas, V. G. Cogswell, Major G. J. Jolly.

Diplock: Philip Russell, B.Arch. (Hons.) (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool); 80 Bedford Street, Liverpool, 8. Prof. L. B. Budden, Prof. William Holford, Prof. Gordon Stephenson.

Dunnett: Frank [Final], Austin House, Chelmondiston, Suffolk. Raymond Erith, E. J. Symcox, Maurice Chesterton.

Flett: David Albert (Edinburgh Coll. of Art: Sch. of Arch.), Sterlochy, Findochty, Banffshire. J. A. O. Allen, A. G. R. Mackenzie, J. G. Marr.

Frith: Thomas Ian, B.A. (Hons. Arch.) (Sheffield) (Univ. of Sheffield: Dept. of Arch.), 33 Thorpe Road, Harthill, Sheffield. Prof. Stephen Welsh, H. B. Leighton, T. C. Howitt.

Gass: Anthony Gilpin, B.Arch. (Hons.) (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 6 Inkerman Terrace, Whitehaven, Cumberland. Prof. L. B. Budden, F. X. Velarde, B. A. Miller.

Griffiths: Myrddin Rhys (Welsh Sch. of Arch.: The Tech. Coll., Cardiff), 28 Merthyr Road, Pontypridd, Lewis John, Harry Teather, C. F. Jones.

Hollamby: Edward Ernest [Final], 8 Albion House, St. Peter's Square, W.6. A. B. Waters, Prof. William Holford, Dr. J. L. Martin.

Holroyd: Geoffrey Hulette, B.A. (Hons.Arch) (Sheffield) (Univ. of Sheffield: Dept. of Arch.), 1 Queensdale Road, Holland Park, W.11. Prof. Stephen Welsh, E. M. Fry, H. B. Leighton.

Howell: Margaret (Miss), B.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), c/o 80 Bedford Street, Liverpool, 7. Prof. L. B. Budden, Prof. W. G. Holford, Prof. Gordon Stephenson.

Jones: David Denison (Leicester Coll. of Art and Tech. Sch. of Arch.), 48 Shirley Avenue, Leicester. F. Chippindale, S. Penn Smith, G. A. Cope.

Leithead: Arthur Ernest (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne, Sch. of Arch.), c/o Norfolk Education Committee, Stracey Road, Norwich. Prof. W. B. Edwards, J. H. Napper, F. W. Harvey.

McGoran: William, B.Arch. (Dublin) (Univ. Coll., Dublin, Ireland: Sch. of Arch.), Faythe House, Wexford, Eire. Prof. J. V. Downes, P. J. Munden, A. E. Beswick.

Mackintosh: Alastair Carson, D.A. (Edinburgh) (Edinburgh Coll. of Art: Sch. of Arch.), 10 Evesham Road, Wallasey, Cheshire. James Shearer, A. H. Mottram, J. R. McKay.

Madeley: Graham Stanbury, Dip.Arch (Birm) (Birmingham Sch. of Arch.), 28 Devonshire Road, Handsworth Wood, Birmingham, 20. T. M. Ashford, J. B. Surman, C. E. M. Fillmore.

Metcalfe: Alan, Dip.Arch. (Leeds) (Leeds Sch. of Arch.), 141 Wakefield Road, Normanton, Yorks. N. R. Paxton, and the President and Hon. Sec. of the West Yorkshire Soc. of Archts. under Bye-law 3 (*a*).

Michell: Gordon Ellis (Arch. Assoc. (London) Sch. of Arch.), 19 Hyde Park Square, W.2. R. F. Jordan, Edward Armstrong, Frederick MacManus.

Millett: Maureen (Mrs.) (The Poly., Regent Street, London: Sch. of Arch.), 42 Royal Crescent, W.11. Peter Moro, Miss Jane Drew, E. M. Fry.

Moat: Audrey Mary (Miss) (Leeds Sch. of Arch.), 24 Carr Manor Grove, Chapel Allerton, Leeds, 7. H. A. Johnson, G. H. Foggitt, Victor Bain.

Oakley: David Francis [Final], 'St. Merryn', 3 Scillonian Road, Guildford. R. D. Scott, A. J. Stedman, S. G. Livock.

Pass: Roger Walter (Leeds Sch. of Arch.), 8 Hollin Drive, Leeds, 6. N. R. Paxton, G. H. Foggitt, F. L. Charlton.

Pegg: Marcus John, Dip.Arch. (Nottm) (Nottingham Sch. of Arch.), 27 Leslie Road, Nottingham. C. F. W. Haseldine, T. N. Cartwright, E. W. Pedley.

Pringle: Derek (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne, Sch. of Arch.), 7 Westminster Road, Middlesbrough, Yorks. Prof. W. B. Edwards, J. H. Napper, W. E. Haslock.

Rabson: Ronald Jeffery (Northern Poly. (London): Dept. of Arch.), 10 Rowhill Mansions, Rowhill Road, Clapton, E.5. T. E. Scott, M. R. Hofler, R. E. Enthoven.

Rolley: Horace William, Dip.Arch. (Birm) (Birmingham Sch. of Arch.), 15 Somerleyton Avenue, Kidderminster, Worcs. The late George Drysdale, Herbert Jackson, W. H. Godwin.

Roper: Arthur Hugh, Dip.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), 10 Bennetts Lane, Gt. Meols, Hoylake, Cheshire. Prof. L. B. Budden, Prof. Gordon Stephenson, Herbert Thearle.

Samuels: Alfred Fox [Final], 13 Hamilton Close, St. John's Wood Road, N.W.8. H. V. Lobb, H. L. Curtis, G. E. Bright.

Savage: Brian Anthony William [Final], 15/16 Clarence Street, Newtown, Bristol, 2. G. D. G. Hake, R. W. H. Vallis, R. C. Foster.

Simpson: Ivan George David, D.A. (Dundee) (Dundee Coll. of Art: Sch. of Arch.), 46 Collingwood Street, Monifieth, Angus, Scotland. John Needham, James Shearer, R. R. Gall.

Spence: William Alexander Bruce, B.Arch. (L'pool) (Liverpool Sch. of Arch.: Univ. of Liverpool), East Anglian Regional Hospital Board, Architect's Dept., 33 Parkside, Cambridge. Prof. L. B. Budden, B. A. Miller, D. Brooke.

Towell: Eric Augustus [Final], 11a Park Hill, Richmond, Surrey. Applying for nomination by the Council under Bye-law 3 (*d*).

Vaughan: Edmund Richard (Leeds Sch. of Arch.), 16 Drummond Road, Leeds, 6. Applying for nomination by the Council under Bye-law 3 (*d*).

Warne: Robert Watkin [Final], White Horse Inn, The Hill, Burford, Oxon. F. R. Cox, H. T. Rainger, W. J. Rogers.

Yeates: Gilbert, Dip.Arch. (Manchester) (Victoria Univ. (Manchester): Sch. of Arch.), The Moorings, 166b Eccles Old Road, Salford, 6. H. F. V. Newsome, Prof. R. A. Cordingley, J. P. Nunn.

AS LICENTIATES (5)

Collard: Frank Allen, 35 Osborne Road, Ainsdale, Southport. Leonard Rigby, Gilbert Fraser, O. D. Black.

Donaldson: John, Town Hall, Wakefield; 2 Poplar Avenue, Dewsbury Road, Wakefield. Alexander Cullen, Harold Conolly, L. W. Hutson.

Kryton: John, c/o Messrs. Lewis and Hickey [*F/A*], 130 Regent Street, W.1; 14 The Chase, Norbury, S.W.16. Patrick Hickey, Joseph Vermont, R. Frankel.

Murray: Albert French, Town Tall, Croydon; 5a Ashburton Road, Addiscombe, Croydon. C. H. Rose, A. D. Sayers, R. Seifert.

Tonge: George Maxwell, 138 Roe Lane, Southport. Norman Jones, Leonard Rigby, Kenmure Kinna.

ELECTION: 2 MAY 1950

An election of candidates for membership will take place on 2 May 1950. The names and addresses of the overseas candidates, with the names of their proposers, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Saturday 8 April 1950.

The names following the applicant's address are those of his proposers.

AS FELLOWS (2)

Bouchard: Valmer Dudley, B.A., B.Arch. (McGill) (*A* 1933), Messrs. Onions and Bouchard, 53 Front Street, Hamilton, Bermuda; 'Windy Hill', Point Shares, Pembroke, Bermuda. Applying for nomination by the Council under Bye-law 3 (*d*).

Onions: Wilfred Richard, B.Arch. (McGill) (*A* 1933), Messrs. Onions and Bouchard, 53 Front Street, Hamilton, Bermuda; 'Aberfeldy', Somerset, Bermuda. Applying for nomination by the Council under Bye-law 3 (*d*).

AS ASSOCIATES (6)

Benjamin: Ezekiel Moses [Final], First Floor, Abdulla Terrace, King Edward Road, Parel, Bombay, 12, India. S. S. Reuben, D. W. Ditchburn, C. M. Master.

Inglis: Alick Walter Gordon [Final], P.O. Box 307, Kampala, Uganda. G. B. E. Norburn, Henry Kendall, S. L. Blackburne.

King: Gordon Grimley, D.S.O., B.Arch. (Sydney) (Passed a qualifying Exam. approved by the R.A.I.A.), 26 O'Connell Street, Sydney, N.S.W., Australia. F. G. Gilling, Prof. Leslie Wilkinson, S. G. Thorp.

Morgan: Mary Patricia (Mrs.) (The Poly, Regent Street, London: Sch. of Arch.), c/o Uriwira Minerals, Ltd., Mpanda, Private Bag, Tabora, Tanganyika Territory. J. S. Walkden, J. M. Easton, Howard Robertson.

Smith: Warwick Leslie (Passed a qualifying Exam. approved by the R.A.I.A.), c/o Messrs. Stephenson and Turner, 16 Barrack Street, Sydney, N.S.W., Australia. A. G. Stephenson, G. L. Moline, D. K. Turner.

Thirsk: John (Special Final Examination), P.O. Box 272, Salisbury, Southern Rhodesia. F. A. Jaffray, C. A. Knight, J. R. Anderson.

Notes from the Minutes of the Council

MEETING HELD 29 NOVEMBER 1949

Appointments

(A) Codes of Practice Council: R.I.B.A. Representatives: Mr. C. J. Epril [*F*] and Mr. Charles Woodward [*A*] in place of Mr. Stanley Heaps [*F*] and Mr. Stanley Hamp [*F*]. In addition Mr. Charles Woodward has been appointed as R.I.B.A. representative on the Executive Committee and on the Building Services and Engineering Services Sectional Committees.

(B) British Building Documentation Committee: R.I.B.A. Representative: Mr. A. Thompson, Assistant Librarian, R.I.B.A., in place of Mr. H. V. M. Roberts. *Note.*—The second R.I.B.A. representative is Mr. Denzil Nield [*A*].

(C) Festival of Britain Working Party on Building Research: Additional R.I.B.A. Representative: Mr. R. N. Wakelin [*A*].

(D) Consultative Committee for the Stone Industry: R.I.B.A. Representative: Mr. A. H. Moberly [*F*].

(E) Royal Sanitary Institute Health Congress, Eastbourne, 24-28 April 1950: R.I.B.A. Delegate: The President of the South-Eastern Society of Architects, or a representative to be nominated by him.

(F) Public Works, Roads and Transport Congress Council: R.I.B.A. Representatives: Mr. S. H. Loweth [*F*] and Mr. R. A. Duncan [*A*], the latter to serve also on the Executive Committee of the Council.

The Gold Medal of the American Institute of Architects: The Secretary reported that the American Institute of Architects had awarded the Gold Medal of the Institute to Professor Sir Patrick Abercrombie, M.A., F.S.A. [*F*]. A very hearty vote of congratulation on this honour was passed in favour of Professor Sir Patrick Abercrombie.

The Honorary Associateship. The Secretary reported that the following had accepted the Council's nomination for election as Honorary Associates: Professor Thomas Bodkin, M.A., D.Litt., M.R.I.A.; Mr. Thomas Downing Kendrick, M.A., D.Litt., F.S.A.; Dr. F. M. Lea, O.B.E., D.Sc.; and Mr. Ian M. Leslie.

Direct Election to the Fellowship: The notices required under Bye-law 11 having been duly given, the Council elected Mr. Ian Gordon Lindsay, B.A., A.R.S.A., F.R.I.A.S., to the Fellowship under the provisions of the Supplemental Charter of 1925, Section IV, Clause 4.

Completion of Premises Fund: The Honorary Secretary reported that a donation of 10 guineas had been received from the County Architects' Society. The appreciation of the Council for this donation was expressed.

Ministry of Health Housing Medal. The Council considered a report from the Allied Societies' Conference which had studied detailed proposals put forward by the Ministry of Health for the award of medals for housing estates and houses of local authorities which attained a high standard of design. The scheme provides for awards to be made annually in each region outside London for one urban scheme and one rural scheme; while in the London region there will be awards for a scheme of new development and a scheme of reconstruction.

The regions referred to are the eleven administrative regions into which England and Wales are divided. An Awards Committee will be set up in each region, and the R.I.B.A. and the Allied Societies concerned will be represented on each committee.

The Council approved the recommendation of the Allied Societies' Conference that the proposals should be approved in principle and that co-operation should be given to the Ministry of Health in organizing the scheme; and a Sub-Committee consisting of the following members was appointed to work out full details with representatives of the Ministry: Mr. C. H. Aslin [*F*], Mr. A. W. Kenyon [*F*] (Vice-Presidents, R.I.B.A.), Mr. Lewis J. F. Gomme [*L*], President, Essex, Cambridge and Hertfordshire Society of Architects.

Revised Code of Professional Practice. The Council approved a joint recommendation of the Practice Committee and the Salaried and Official Architects' Committee introducing a revised Code of Professional Practice. It was agreed that the revised code should be approved subject to minor amendments after consultation with the Institute's legal adviser: that it should in future be known as the R.I.B.A. Code of Professional Conduct and that copies should be sent to every member and Student.

Restriction on Movement of Architects and Architectural Assistants: The Council considered a report made by the Salaried and Official Architects' Committee after studying evidence from various sources that local authorities are attempting to enforce unilateral restrictions on the freedom of movement of architects and architectural assistants.

The Council endorsed the view expressed by the Committee that it was unjust and improper for employing authorities to extract from employees or applicants an undertaking to serve for a specified time, unless the authority also bound itself to the same time limit. It was agreed to make public the Institute's view that there should be no restriction imposed on the freedom of movement in employment of architects and architectural assistants other than mutually agreed periods of notice.

Ministry of Works: Regional Joint Production Committees: The Secretary reported that the National Consultative Council of the Building and Civil Engineering Industries had approved proposals made by the Ministry of Works for reorganizing and improving the advisory services sponsored regionally by the Ministry.

These proposals had previously been considered in draft form by the Institute. The Institute has now been invited to appoint a representative to serve on the regional joint production committee located at the headquarters of each of the eleven administrative regions into which England and Wales are divided.

Membership: The following members were elected: As Fellows, 15; as Associates, 396; as Licentiates, 6. Students: 165 Probationers were elected as Students.

Application for Election: Applications for election were approved as follows: *Election 3 January* 1950: As Honorary Associates, 4; as Honorary Corresponding Members, 2; as Fellows, 6; as Associates, 81; as Licentiates, 8. *Election* 4 *April* 1950 (*Overseas Candidates*); As Fellows, 1; as Associates, 13.

Applications for Reinstatement: The following applications were approved: As Fellows: Herbert Reginald Cowley, Andrew Sharp; as Licentiates: Sidney Burn, Clarence Ernest Holloway.

Resignation: The resignation of Miss Thelma Hermione Elliott [*A*] (Mrs. Knight) was accepted with regret.

Applications for Transfer to Retired Members' Class under Bye-law 15: The following applications were approved: As Retired Fellows: Harold Wynne Currey, Frank Stanley Swash; as Retired Licentiates: Frederic Arthur Broad, Walter William Roberts.

Obituary: The Secretary reported with regret the death of the following members: Frank I'Anson Bloomfield [*F*], George Drysdale [*F*], Thomas Harold Hughes [*F*], Albert Edward Kingwell [*F*], Alexander George Adkin [*Retd. F*], David Williamson Campbell [*L*], Edward Henry Eley, C.M.G., C.B.E., D.S.O., D.L. [*L*], Sidney Albert Gulliford [*L*], Frederick Daniel Pipe [*L*], Percy John Waldram [*L*], John Joseph Berchmans Keenan (Student), Charles Sidney Sandford, President of the Sheffield, South Yorkshire and District Society of Architects and Surveyors.

The Secretary was also instructed to express to Sir Giles Gilbert Scott (Past President) the Council's sincere sympathy in the loss he had sustained through the death of Lady Scott.

Members' Column

This column is reserved for notices of changes of address, partnership and partnerships vacant, or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

Mr. W. R. Hand [*L*] has been appointed Architect to Godstone Rural District Council, with effect from 1 January 1950, and will be pleased to receive trade catalogues etc. addressed to him at the Godstone R.D.C. Council Offices, Oxted, Surrey.

Mr. H. Peter Oberlander [*A*] has been appointed Assistant Professor of Planning and Design at the University of British Columbia. His address until further notice will be c/o School of Architecture, University of British Columbia, Vancouver, B.C.

PRACTICES AND PARTNERSHIPS

Mr. Wells Coates, O.B.E., R.D.I., Ph.D. [*F*], and **Miss Jaqueline Tyrwhitt,** A.M.T.P.I., A.I.L.A., have entered into partnership. With a group of associates and consultants they will practise under the style of **Wells Coates, Jaqueline Tyrwhitt and Associates,** Architects, Town and Landscape Planning Consultants, 18 Yeoman's Row, London, S.W.3. (KENsington 9252-3.)

Mr. Gordon E. Coburn, M.B.E. [*A*], has from 1 January 1950 commenced practice at Miller's Buildings, Broken Hill, Northern Rhodesia, and will be pleased to receive trade catalogues etc. addressed to him c/o The Post Office, Broken Hill, Northern Rhodesia; all other correspondence to be similarly addressed.

Mr. Cyril J. Greening, A.M.T.P.I. [*A*], has now secured permanent office accommodation, and is continuing his practice at 77 London Road, East Grinstead, Sussex (East Grinstead 290), where he will be pleased to receive trade catalogues etc.

The practice of the late **Mr. Arthur J. Hayes** [*L*] has been acquired by **Mr. John H. Thraves** [*L*] and **Mr. R. V. Walker** [*L*], who continue the practice under the style of **Thraves and Walker** at 100 Queen Street, Cardiff. (Cardiff 2615.)

Mr. J. W. Overall [*A*] and **Mr. Gavin Walkley,** M.A., M.Litt., B.E. [*A*] have entered into partnerhip and will practise (from January 1950) under the name of **Overall and Walkley** at 31 Grenfell Street, Adelaide, South Australia.

Mr. Robert W. Pite [*F*] is retiring from the practice of **Pite, Son and Fairweather** as from 28 February 1950. The practice will be continued under the same name by the other partners, **Mr. Hubert M. Fairweather** [*F*], **Mr. Geoffrey H. Fairweather** [*A*], and **Mr. W. N. Bruce George** [*A*] at the present address, 6 Queen Anne's Gate, Westminster, London, S.W.1.

Mr. T. J. Rushton [*F*], partner of the late **Sir Charles Nicholson,** Bt., M.A. [*F*], has taken into partnership his son, **Mr. H. T. Rushton** [*L*]. The practice will continue under the style of **Nicholson and Rushton,** 2 New Square, Lincoln's Inn, London, W.C.2. (HOLborn 6228.)

Mr. L. C. Powell [*F*] and **Mr. E. S. North** [*A*] of Norfolk House, Station Road, Chesham, Bucks, have taken **Mr. N. F. Sanders** [*A*] into partnership. They will practise as **Powell, North and Sanders** [*F/A/A*].

Messrs. Pyle and Saint [*L/A*], of Thomas Street House, Cirencester, have opened a branch office at 5 Tailor's Court, Broad Street, Bristol 1, where the managing assistant, **Mr. E. A. Clarke** [*A*] will be pleased to receive trade catalogues etc.

Mr. E. Howard Sadler [*A*] has commenced private practice at 14 Hadley Road, New Barnet, Herts (BARnet 2191), a temporary address, as from 31 December 1949, upon which date his partnership with **Mr. Edward Armstrong** [*F*], of 19 Manchester Square, London, W.1, terminated by mutual agreement.

Mr. James Shearer, R.S.A. [*F*], has taken into partnership **Mr. George Annand** [*A*]. The firm will continue to practise at 11 Maygate, Dunfermline, under the style of **James Shearer and Annand.**

Mr. E. C. Scherrer [*F*] and **Mr. J. K. Hicks** [*F*], practising as **Scherrer and Hicks** at 19 Cavendish Square, London, W.1, have taken into partnership as from 1 January 1950, **Mr. H. R. Hayhoe** [*A*]. The style of the firm remains unchanged.

Mr. Reginald G. Smith [*L*] of 18 St. Georges' Road, Commonside East, Mitcham, Surrey, will be pleased to receive trade catalogues etc. addressed to him at 19-23 Gloucester Road, London, S.W.7.

Mr. L. Beddall Smith [*A*] has opened an office at 43 Cloth Fair, London, E.C.1 (MONarch 2050), and will be pleased to receive trade catalogues etc.

Mr. W. A. J. Spear [*L*] has commenced private practice at 36 Cattle Market Street, Norwich.

Courtenay Theobald and Deane Skurray [*F*] terminated their partnership by mutual agreement on 31 December 1949. **Mr. Deane Skurray** will carry on practice at 116 Broad Street, Reading, and **Mr. Courtenay Theobald** [*F*] will join **Mr. Maxwell Ayrton** [*F*] and **Mr. J. A. Lynch** in forming a partnership which will practise as **Maxwell Ayrton and Partners,** with offices temporarily at 9 Church Row, Hampstead, London, N.W.3.

Mr. Edmund Ward [*A*] has resigned his partnership with **Sir John Brown, A. E. Henson and Partners** with effect from 30 November 1949.

Messrs. P. J. Westwood and Sons [*F/A*] and **Mr. J. E. K. Harrison** [*F*] have amalgamated their practices and will in future practise as **Westwood, Sons and Harrison** at their present address, 3 Raymond Buildings, Gray's Inn, London, W.C.1 (CHAncery 8667 and HOLborn 5394) and at Nutfield, Heath Road, Weybridge, Surrey (Weybridge 182).

CHANGES OF ADDRESS

Mr. Geoffrey and **Mrs. Eleanor M. Beard** [*A/A*] have removed to 98 Woodstock Road, Oxford (Oxford 59797).

Mr. John Bolton [*L*] has removed to 33 Hamilton Street, Greenock (Greenock 2449), and will be pleased to receive trade catalogues etc.

The address of **Mr. G. R. Vaughan Ellis** [*A*] for trade catalogues, correspondence etc. is now 28 Eccleston Road, West Ealing, London, W.13.

Mr. Maurice W. Jones [*L*] has removed from 15 The Tything, to 1 College Yard, Worcester.

Mr. Sergei Kadleigh [*A*] has removed from 63 Abingdon Villas, London, W.8, to 29 Sackville Street, London, W.1. (REGent 5864-5.)

Mr. J. Konrad, A.M.T.P.I. [*F*], has removed to 112 Park Avenue, Hull, Yorkshire (Hull 18744), and will be pleased to receive trade catalogues etc.

The address of **Mr. E. John Preece** [*A*] is 31, Brooklands Park, Longlevens, Gloucester, and *not* 29 Brooklands Park, as is shown in the R.I.B.A. Kalendar, 1949-50.

Mr. Cyril G. Runnicles [*A*] has removed from Flat 1, 1 Marsh Lane, Stanmore, to The Pantiles, Clonard Way, Hatch End, Middlesex.

Mr. J. Clifford Smart [*A*] has removed to 'Copperidge,' Abercorn Road, Mill Hill, London, N.W.7.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

Licentiate (48) with wide experience in all branches of the profession, at present acting as Chief Architect to large commercial concern in London, seeks contact with architect(s) in private practice in South or South-West England with view to partnership being arranged. Good possibility of introducing new clients. Box 2, c/o Secretary, R.I.B.A.

Practice for disposal in Welsh industrial area. Principal retiring owing to ill-health. Suitable for young qualified person. Audited accounts available for inspection. Box 3, c/o Secretary R.I.B.A.

Partnership, with view to future purchase, offered in old-established architect's and surveyor's general practice in busy West Riding market town. Good prospects for qualified man. Box 1, c/o Secretary, R.I.B.A.

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